DENON

Hi-Fi Digital Audio Tape Recorder

SERVICE MANUAL

MODEL DTR-80P

DIGITAL AUDIO TAPE RECORDER

DAT
Digital Audio Tape

CONTENTS

NIPPON COLUMBIA CO., LTD.

CAUTION

RISK OF ELECTRIC SHOCK

DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

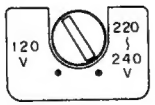
The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

CAUTION	ATTENTION
TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.	POUR PREVENIR LES CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

- **Line Voltage Selection (for multiple voltage model only)**
  - * The desired voltage may be set with the VOLTAGE SELECTOR knob on the rear panel, using a screwdriver.
  - * Do not twist the VOLTAGE SELECTOR knob with excessive force as this may cause damage.
  - * If the VOLTAGE SELECTOR knob does not turn smoothly, please contact a qualified serviceman.



Congratulations on your selection of the DENON DTR-80P Digital Audio Tape Recorder. To obtain optimum performance and ensure long-term reliability from your new DTR-80P, be sure to read this manual carefully. And when you're finished reading these instructions, be sure to store this manual where you can refer to it often.

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- In no event will DENON and its suppliers be liable to you or any other person for any damages, including any incidental or consequential damages, expenses, lost profits, lost savings or any other damages arising out of use of or inability to use this manual or the product that it describes.
- The contents of this manual are subject to change without notice.

Contents

DTR-80P features

- **Compact, lightweight, fully portable**
  Use the DTR-80P at home or take it along with you for musical enjoyment both indoors and out.
- **Outstanding sound quality**
  Digital PCM recording and playback capabilities eliminate the noise, distortion, wow and flutter associated with analog system. This plus frequency characteristics and a dynamic range that are virtually incomparable with analog systems give you startlingly realistic fidelity.
- **Automatic Search function**
  Press a button and instantly skip to the beginning of the selection you wish to hear.
- **Highly accurate time displays**
  A glance at the display shows you the elapsed time from the beginning of the tape (Absolute Time Display), the amount of time remaining on the tape (Remaining Time Display), and the amount of time for each selection (Program Time Display).
- **Microphone recording**
  A built-in microphone amplifier allows direct connection of microphones to the DTR-80P.
- **Dual digital input terminals**
  Both coaxial and optical digital input terminals are built in, giving you wide ranging digital signal recording capabilities.
- **Long-play recording mode**
  Get up to four hours of recording on a 120-minute tape for analog signals and 32 kHz digitally sampled signals.
- **Single-selection/all-selection repeat playback**
- **44.1 kHz analog recording for CD mastering**
- **Store-bought Alkali batteries usable**
  Alkali batteries can be used for approximately 4 hours of continuous playback or 3.5 hours of continuous recording.

Before using your DAT recorder for the first time

Besides audio data, DAT recordings automatically include special ***sub-codes*** on the tape.

There is a variety of possible sub-code data that can be included on a tape depending upon the manufacturer of the equipment used to produce the recording. The DENON DTR-80P DAT Recorder automatically registers data to indicate the beginning of each selection (Start ID), the elapsed time from the beginning of the tape, and the elapsed time for each selection. These subcodes are used during playback for such functions as Automatic Search, etc.
Though sub-codes are registered automatically, operating the recorder incorrectly can result in the registration of erroneous sub-codes. Be sure to read the instructions included in this manual carefully before using the unit. For more details on sub-codes, see page 29 of this manual.

Before Using This Unit

Power source

- This unit is equipped with an AC power adaptor. Make sure that the operating voltage of your unit is identical to the voltage of your local power supply.
- To disconnect the AC adaptor cord, pull it out by grasping the plug. Also, never place heavy objects on the AC adaptor cord.
- Unplug the unit from the wall outlet if it is not to be used for an extended period of time.

Handling precautions

Never place this unit in the following locations.

- In direct sunlight, near heaters or other areas subject to high temperatures.
- In locations subject to extremely low temperatures or excessive dust.
- In locations subject to high levels of humidity.
- On top of speakers, televisions or other devices which utilize magnetic force.
- In locations subject to high vibration.

Avoid strong impact, and never attempt your own maintenance.

- Do not drop this unit or subject it to severe impact.
- Never disassemble or attempt to repair or modify the DTR-80P in any way.
- Never allow foreign matter such as hair pins, liquids, etc. to enter the unit.
- Never insert objects into jacks, the cassette holder, the power terminal, etc.

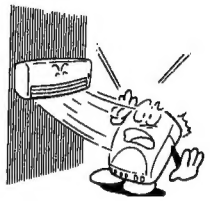
Never place objects on top of this unit.

Notes on condensation

If the DTR-80P is brought directly from a cold to a warm location, or is placed in a very damp room, moisture may condense on the drum and head components.
Should this occur, the unit will not operate, and the following message will flash on the built-in display:

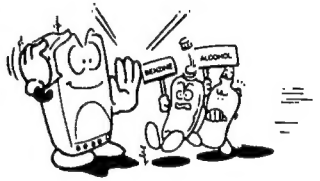
-- DEW --

If this message appears, switch power off and wait 1 to 2 hours before attempting to use the unit again.

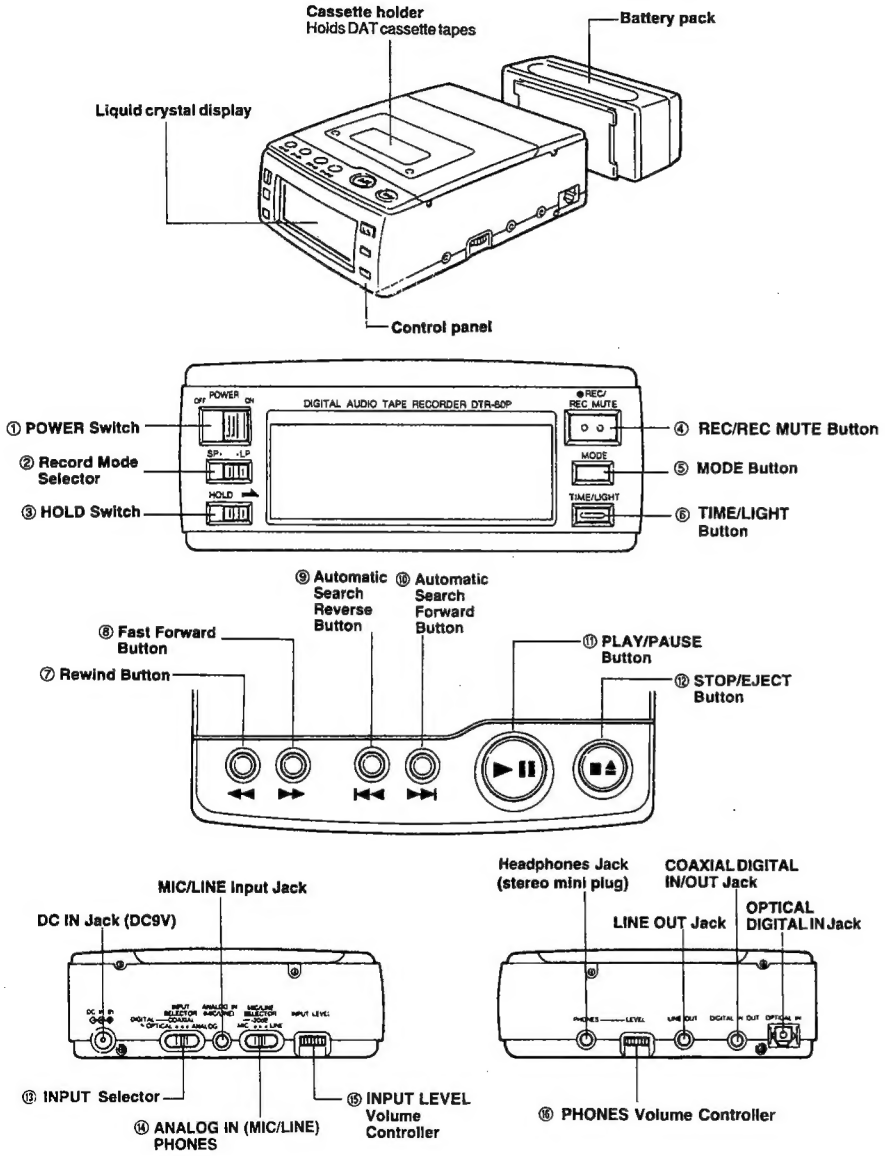


Care of your DTR-80P

- Clean the exterior of the unit and controls with a soft cloth lightly moistened with mild solution of detergent and water. Do not use any type of abrasive pad, scouring powder or solvents such as alcohol or benzine.
- Do not allow dust or dirt to come in contact with the unit's revolving heads. If the heads become dirty, clean them with a commercially available DAT head cleaning tape.



General Guide



Controls

① POWER Switch
Use this switch to turn power on and off.

② Record Mode Selector
Use this selector to switch between standard play (SP) and long play (LP).

③ HOLD Switch
This switch lets you lock out operations of certain controls in order to avoid unintentional changes in recording, etc.

④ REC/REC MUTE Button
Press this button to enter record standby. You also use this key to insert blank (recorded blank) spaces between programs (REC/REC MUTE function).

⑤ MODE Button
Use this button to select Start ID editing modes (page 32), to switch the AUTO-ID on and off, and to register end IDs. You also use this button to specify fade in/fade out and repeat playback.

⑥ TIME/LIGHT Button
Press this button to select the time display. If you hold the button down for at least one second, the display light comes on. To turn out the light hold this button down again for at least one second.

⑦ (◀◀) Rewind Button
Press this button to rewind the tape. You can also use this button while the tape is playing to review playback.

⑧ (▶▶) Fast Forward Button
Press this button to fast forward the tape. You can also use this button while the tape is playing to cue ahead.

⑨ (I◀◀) Automatic Search Reverse Button
Press this button once to skip directly to the beginning of the current program. By pressing this button more than once, you can skip back any number of programs you want.

⑩ (▶▶I) Automatic Search Forward Button
Press this button once to skip directly to the beginning of the following program. By pressing this button more than once, you can skip forward any number of programs you want.

⑪ (▶II) Play/Pause Button
Press this button while the tape is stopped to start playback or recording. Pressing this button while the tape is moving stops tape transport without exiting playback/recording. Press this button again to restart playback.

⑫ (■⏏) Stop/Eject Button
Use this button to stop tape transport. Pressing this button while the tape is stopped opens the cassette holder.

⑬ INPUT Selector
Use this selector to switch between optical, coaxial, and analog signal input.

⑭ ANALOG IN (MIC/LINE) Selector
Use this selector to switch between standard level microphone, –20 dB attenuated level microphone, and line analog input.

⑮ INPUT LEVEL Volume Controller
Use this controller to adjust the analog input recording level.

⑯ PHONES Volume Controller
Use this controller to adjust the headphones level.

Power Source

This set can be used on a household power source, alkali battery pack, rechargeable Ni-cd battery pack (sold separately), or car battery adapter (sold separately).

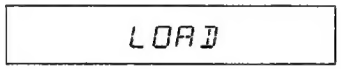
Using household current

An AC adaptor is required when using household current.

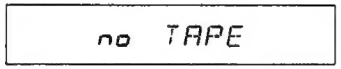
1 With the unit switched OFF, connect the AC adaptor to the DC IN jack.

2 Plug the AC adaptor unit into an AC outlet.

3 Switch power ON.
The liquid crystal display will appear as shown below.
- If a tape is loaded in the unit



- If no tape is loaded



CAUTION

Be sure to use only the AC adaptor that comes with the unit. Using any other adaptor can result in serious damage to the unit or adaptor. Never use any other type of adaptor except the one that comes with this unit. Damage caused by using any other type of adaptor is not covered by your warranty.

IMPORTANT

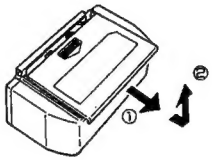
- The adaptor may become warm when it is being used. This is normal and does not indicate any problem.
- Be sure to unplug the adaptor from the power source when you are not using the unit.
- Whenever connecting or disconnecting the adaptor, be sure that the power of the unit is switched off.
- Never use a power supply that does not match that specified for the unit. Doing so can damage the adaptor or your unit.

To Use an Alkali Battery Pack

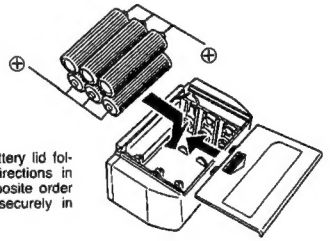
Use the included AP-20 alkali battery pack. Use the included (or store-bought) alkali batteries (LR6/L40).

Inserting the batteries

1 Slide the battery lid in direction ① as shown on the diagram, then lift it in direction ② .



2 Insert the six alkali batteries securely in the proper "+" and "–" directions, then close the battery lid.



Close the battery lid following the directions in **1** in the opposite order and lock it securely in place.

- When using alkali batteries, the set can be used for approximately 4 hours of continuous playback or 3.5 hours of continuous recording. However, this time may differ according to the type of alkali batteries used.
- Store-bought manganese batteries (R6P/AA) or rechargeable batteries can also be used, but their continuous operating time is shorter than when alkali batteries are used.
- When using store-bought rechargeable batteries, use a store-bought charger.

About the low battery indicator

A low battery indicator **BATT** appears on the display to alert you that the power of the battery pack is getting low.

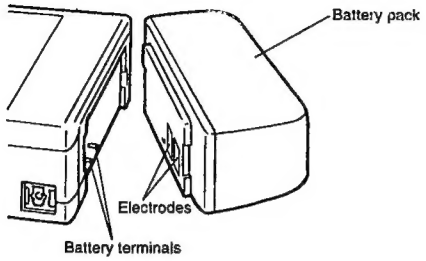
The DTR-80P power will automatically switch off when the low battery indicator lights.

IMPORTANT

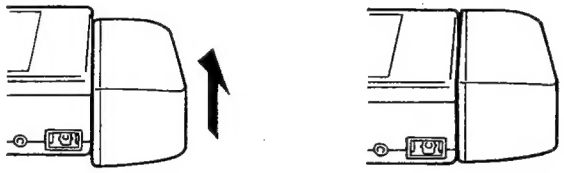
Other precautions
- Never short circuit the electrodes or DC IN jack.
- Never allow the battery pack to come into contact with fire or a direct flame.
- Never try to disassembly or otherwise modify the battery pack.

To attach the battery pack to the DTR-80P

1 Align the battery pack's electrodes with the battery terminals of the DTR-80P.

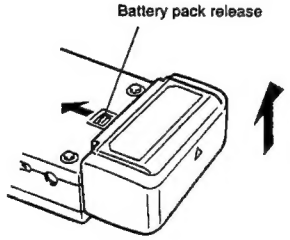


2 Position the battery pack on the end of the DTR-80P and slide it up as shown in the illustration. Firmly but gently slide the battery pack up until it clicks into place.



To detach the battery pack from the DTR-80P

Holding the battery pack release in the direction shown in the illustration, slide the battery pack off the DTR-80P.



Auto power off function

The DTR-80P features an "auto power off" function which automatically turns OFF power 6 minutes after the last operation of the unit. To return to normal operation, simply press ⏻ button. If you want to cancel the Auto Power OFF function for continuous power, hold down ⏻ (or REC/MARK) when you switch the power ON.

When you hold down REC/MARK to cancel the Auto power off function, the sampling frequency of analog input recording is set to 44.1 kHz (page 19).

To Use a Rechargeable Ni-cd Battery Pack

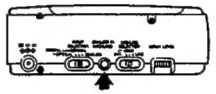
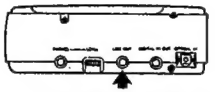
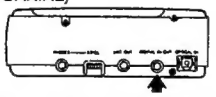
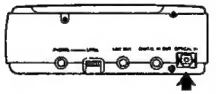
Use the separately sold AP-18 rechargeable Ni-cd battery pack. For details, refer to the operating instructions of the AP-18.

To Use a Car Battery Adapter

Use the separately sold AP-19 car battery adapter. For details, refer to the operating instructions of the AP-19.

Connections

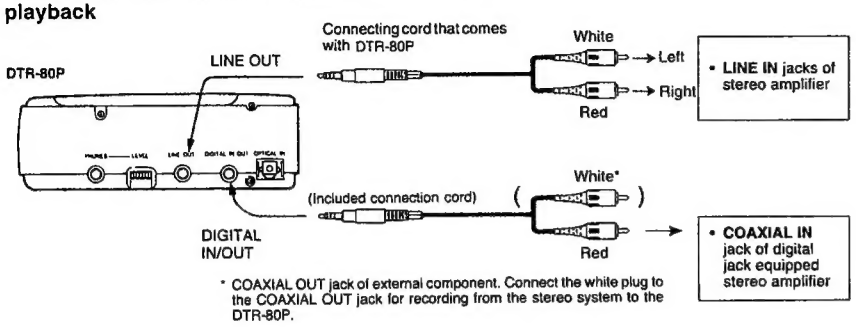
Before you connect the DTR-80P to any other device, be sure to first switch off the power of the DTR-80P and the other device. Note that the connecting cord you use depends on the type of jack you are connecting to.

Jack	Cord/External Device Jack
MIC/LINE 	Connecting cord that comes with DTR-80P MIC/LINE White Red LINE OUT Left Right (Pin jack)
LINE OUT 	Connecting cord that comes with DTR-80P LINE OUT White Red LINE IN Left Right (Pin jack)
DIGITAL IN/OUT (COAXIAL) 	Connecting cord that comes with DTR-80P DIGITAL IN/OUT Do not using any cord other than the included connection cord. White Red COAXIAL OUT COAXIAL IN (Pin jack)
DIGITAL IN (OPTICAL) 	Commercially available optical connecting cord OPTICAL IN OPTICAL OUT

- A protective cap is installed in the OPTICAL IN jack before the DTR-80P is shipped from the factory. Remove the cap before trying using the OPTICAL IN jack, and keep the cap handy so you can replace it when you are through using the jack. If you leave the OPTICAL IN jack uncovered when it is not in use, there is the danger of dust or other foreign matter getting inside, which can result in malfunction during recording.

Sample connections for playback

To play the DTR-80P through the speakers of a stereo system, connect it to the system's amplifier.

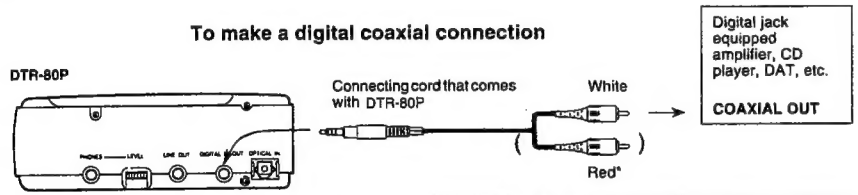


* COAXIAL OUT jack of external component. Connect the white plug to the COAXIAL OUT jack for recording from the stereo system to the DTR-80P.

Sample connections for recording

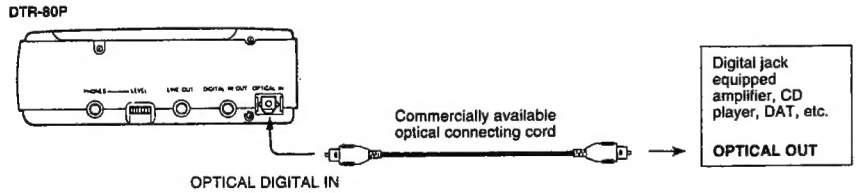
To record the signal from an external device on the DTR-80P, make connections using one of the configurations shown below.

To make a digital coaxial connection

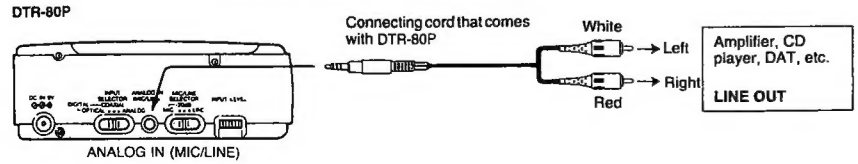


* Connect the red plug to the COAXIAL IN jack for playback from the DTR-80P through the stereo system.

To make a digital optical connection

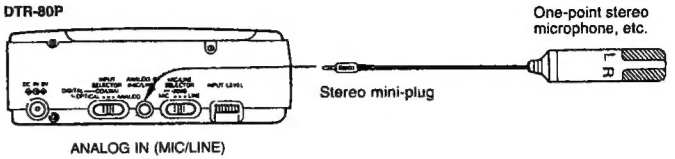


To make an analog connection



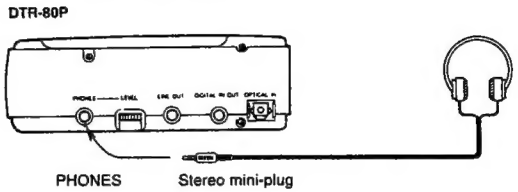
To connect a microphone

You can connect any microphone with a stereo mini-plug (ϕ3.5mm) to the DTR-80P. To connect a microphone that has a phone plug, use a stereo mini-plug adaptor.



To connect headphones

You can connect any set of headphones that has a stereo mini-plug to the DTR-80P. To connect headphones that have a phone plug, use a stereo mini-plug adaptor. Use the Headphone Volume Control to adjust the volume of output through the headphones.



IMPORTANT

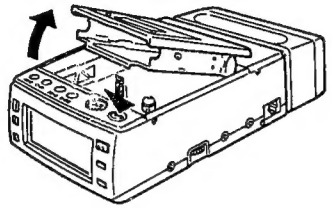
Separately sold wired remote control unit (RC-423)

- For instructions on the wired remote control unit, refer to the manual for the separately sold wired remote control unit (RC-423).
  Timer recording (and playback) is possible if the wired remote control unit is used.
  Never connect anything other than the specified items (headphones, optional remote controller) to the PHONES jack.

Using DAT Cassette Tapes

Loading a tape

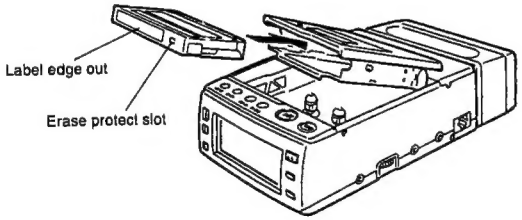
1 With DTR-80P power ON, press ⏏ on the top of the unit. The cassette holder will open.



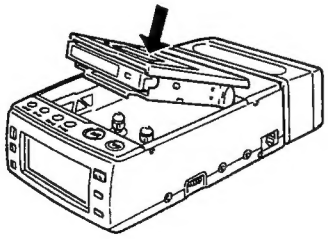
IMPORTANT

The cassette holder will not open if you press ⏏ during playback or recording. Be sure to stop the playback/record operation before trying to open the cassette holder.

2 Load the tape face up into the holder, as illustrated.



3 Close the cassette holder by gently pushing down at the point indicated by the arrow.

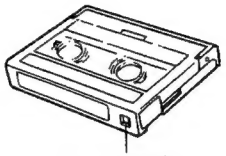


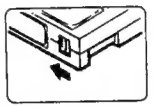
To remove cassette tapes

Press ⏏ on the top of the unit while the tape is stopped, and the cassette holder will open (even if power is switched OFF). Remove the tape and press the holder down to close it.

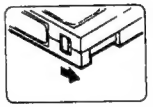
Tape handling precautions

- Be sure to use only DAT cassette tapes in this unit.
- Unlike conventional analog cassette tapes, DAT tapes record/playback on only ONE side of the tape.
- To prevent the contents of any tape from accidentally being erased, simply open the erase protect slot as illustrated below.





OPEN: When the tab is to the left, contents of the tape cannot be recorded over.



CLOSED: When the tab is to the right, contents of the tape can be recorded over.

About tapes and playing time

The DTR-80P features two recording modes: a Standard Play (SP) mode and a Long Play (LP) mode. The following table shows the amount of recording and playback time you get in each mode with various types of tape.

Tape Type	Recording/Playback Time	
	SP mode	LP mode
46 - minute	46 minutes	92 minutes
60 - minute	60 minutes	120 minutes
90 - minute	90 minutes	180 minutes
120 - minute	120 minutes	240 minutes

Recording Operations

The DTR-80P is capable of recording digital and analog signals. The following describes each operation and the best applications in which you should use it.

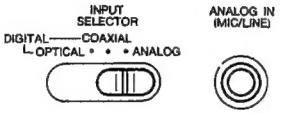
Making Analog Recordings

You can make analog recordings from line input or microphone input. When a signal from an analog microphone or the LINE OUT terminal of an audio device enters the ANALOG IN (MIC/LINE) terminal of the DTR-80P, it is converted into a digital signal. If the DTR-80P is in the SP (standard play) mode, the sampling frequency for the conversion is 48 kHz, while the LP (long play) mode provides 32 kHz sampling.

To set up for 48 kHz SP analog recording

1 Switch power on.

2 Set the **INPUT** selector to ANALOG IN (MIC/LINE).

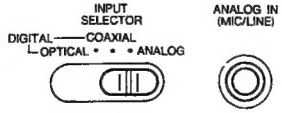


3 Set the **Record Mode** selector to SP.

To set up for 32 kHz LP analog recording

1 Switch power on.

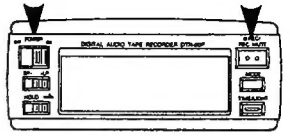
2 Set the **INPUT** selector to ANALOG IN (MIC/LINE).



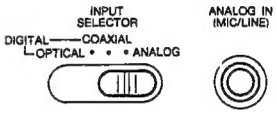
3 Set the **Record Mode** selector to LP.

To set up for 44.1 kHz SP analog recording

1 Holding down , switch power on.



2 Set the **INPUT** selector to ANALOG IN (MIC/LINE).



3 Set the **Record Mode** selector to SP.

- Never change the settings of the **INPUT** selector or the Record Mode selector while a recording is in progress.

About sampling frequencies

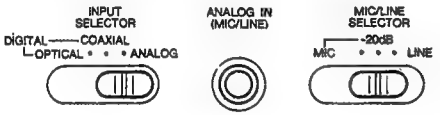
The DTR-80P has three sampling frequencies for recording and playback: 48 kHz, 44.1 kHz, and 32 kHz. Generally, the compact discs and prerecorded DAT tapes you can buy at the store have a sampling frequency of 44.1 kHz.

To record analog input

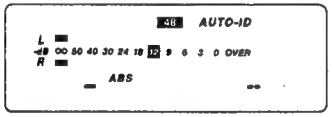
1 Connect the analog source (either a line source or a microphone source) to the DTR-80P.

2 Set up the DTR-80P for the type of recording you want to perform as described on page 14.

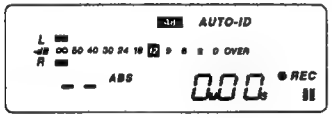
3 Slide the **MIC/LINE** selector to LINE for line input, or MIC/–20 dB for microphone input.



4 Load a tape into the DTR-80P and press ⏮ to rewind the tape to its beginning to record the ABS (Absolute time; page 43) sub-code correctly. For details on recording from a point on a partially recorded tape, see page 25.



5 Hold down REC/REC MUTE. The message "ANALG" appears on the display for about 1 second. At this time the DTR-80P starts to create a 3-second recorded blank (see page 30) on the tape, a process that takes about three seconds. Next, the DTR-80P enters REC PAUSE (recording pause).

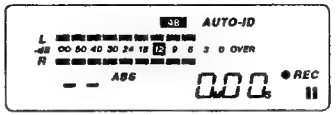


IMPORTANT

- Right after you switch on power, the DTR-80P takes some time to perform an internal set up routine that prepares its mechanical and electronic components for operation. Because of this, you have to wait about 10 seconds before pressing REC/REC MUTE to start recording or to activate the monitor function.

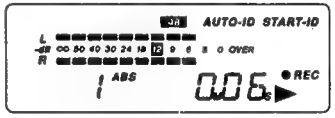
- If you leave the DTR-80P in REC PAUSE for longer than about five minutes, it automatically exits REC PAUSE.
- While in REC PAUSE, you can also set up for fade in recording (page 27).

6 Use the **INPUT LEVEL** volume controller to adjust the recording level. Make sure that the level indicated on the level meter does not enter into the "OVER" area.



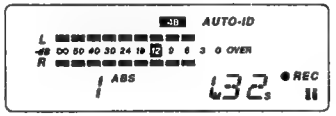
7 Use MODE to select between AUTO-ID and manual ID recording (page 32).

8 To start recording, press ⏯.



To stop recording

To enter REC PAUSE and stop movement of the tape, press ⏯.



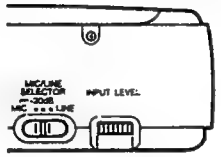
While AUTO-ID (page 32) is on, START-IDs are registered automatically. It takes about nine seconds for a START-ID to be registered, and you cannot use ⏯ during that 12-second period.

To stop movement of the tape and exit the recording operation, press ⏹.

To adjust the recording level

While listening to the sound you want to record (with the unit in REC PAUSE), you can adjust the recording volume level of both channels with the INPUT LEVEL Volume controller. The sound will become distorted during playback if the recording level exceeds 0 dB. The level meter holds the peak level for 1 seconds, so you can adjust the level to record between –12 dB and 0 dB. Try to keep the peak level as close to 0 dB as possible, without exceeding lit.

If you record outdoors, it may be difficult to determine the peak value. In this case, lower the recording level slightly (so that the peak is at about –12 dB).



Adjust so that the level does not enter the "OVER" zone on the meter. Sounds that are recorded with the level staying in the "OVER" zone are distorted when played back.

About the Microphone Attenuator

When you are recording from a standard microphone, set the MIC/LINE selector to "MIC". Note, however, that very loud sounds during microphone recordings can cause distortion in the playback, even if the recording level is set to a relatively low level. If in the "MIC" setting you find it necessary to set the INPUT LEVEL Volume controller dial to 3 or below to keep the record level below the "OVER" zone, change the setting of the MIC/LINE selector to "–20 dB". This automatically attenuates (reduces) the microphone input volume and makes it easier to make a clear recording.

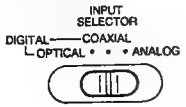
Making Digital Recordings

You can make digital recordings from optical digital input or coaxial digital input. When a signal from compact disc player, another DAT deck, or any other device equipped with a DIGITAL OUT jack enters the DIGITAL IN terminal of the DTR-80P, it is recorded directly as a digital signal. The DTR-80P automatically selects the correct sampling frequency (see page 19) in accordance with the frequency of the signal from the source. When the sampling frequency of the source is 32 kHz, you can select between SP (standard play) and LP (long play) for the DTR-80P using the **Record Mode** selector.

To record digital input

1 Connect the digital source to the DIGITAL IN/OUT jack or OPTICAL IN jack of the DTR-80P.

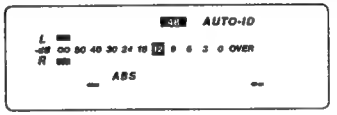
2 Set the **INPUT** selector to either COAXIAL or OPTICAL, depending on what type of connection you are using.



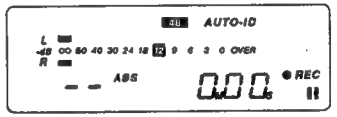
3 If you wish to record using a 32 kHz sampling frequency, set the **Reord Mode** selector to either SP (Standard Play) or LP (Long Play).

- For other sampling frequencies, the DTR-80P enters the SP (Standard Play) mode automatically, regardless of the **Record Mode** selector setting.

4 Load a tape into the DTR-80P and press ⏮ to rewind the tape to its beginning. For details on recording from a point on a partially recorded tape, see page 25.



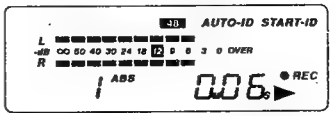
5 Hold down REC/REC MUTE ⏺. The message "DGITL" appears on the display for about 1 second. At this time the DTR-80P starts to create a 3-second recorded blank on the tape. Next, the DTR-80P enters REC PAUSE (recording pause).



- If you leave the DTR-80P in REC PAUSE for longer than about five minutes, it automatically exits REC PAUSE.
- You do not need to adjust the recording level for digital input.

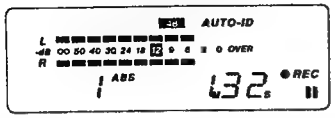
6 Use MODE to select between AUTO-ID and manual ID recording (page 32).

7 To start recording, press ⏯.



To stop recording

To enter REC PAUSE and stop movement of the tape, press ⏯.



While AUTO-ID (page 32) is on, START-IDs are registered automatically. It takes about nine seconds for a START-ID to be registered, and you cannot use ⏯ during that 9-second period.

To stop movement of the tape and exit the recording operation, press ⏹.

Things to Remember While Recording

- If the DTR-80P detects a record prohibit in the digital input while recording, the message "PROHB" appears on the display and the record operation enters a pause (see page 44 for details).
- Whenever all the sampling frequency indicators (32 kHz, 44.1 kHz, 48 kHz) appear flashing on the display while the unit is in REC PAUSE, it means that digital data is not being received or that incompatible data is being received. Even if you press ⏯ in this situation, the DTR-80P stays in REC PAUSE and "▶" flashes on the display until valid digital data is received. Receipt of valid data starts recording automatically. You can stop the "▶" flashing and return to REC PAUSE by pressing the ⏯ button.
- Never change the settings of the INPUT selector or the **Record Mode** selector while a recording is in progress.
- Interruption of valid digital data during digital recording causes the unit to enter REC PAUSE automatically with "▶" flashing on the display.
- The DTR-80P automatically exits REC PAUSE and switches to the monitor function (page 26) if you do not perform any key operation for five minutes during REC PAUSE. At this time, the message "AD/DA" also appears on the display indicating that the unit is monitoring the input signal.
- If the erase protect slot of the tape you are using is open, the message "no REC" appears on the display when you press ⏺ to indicate that you cannot record.

Recording Mid-way Through a Tape

Use the following procedure to start recording mid-way through a tape.

1 Load the tape you want to record on into the DTR-80P.

2 If the "ABS" indicator is not already shown on the display, hold down the TIME/LIGHT button until it appears.

3 Use cue and review (page 38) to locate the point from which you want to make the new recording and stop the tape. Check to make sure that the ABS time (page 29) is shown on the display.

- If the above operation produces the display "-- -- --", it means the ABS time registered for the previous recording was not registered correctly, so further recording does not include ABS time. Note that ABS time cannot be added later to a recording. If you want the ABS time included on the tape, you must re-record the previous recording, taking care that the ABS time is registered correctly. See page 43 for full details on recording to include the ABS time.
- If you want to start your new recording from a section with a non-recorded blank (page 30), simply load the tape and press ⏺. The DTR-80P will automatically stop just before the non-recorded blank.
- If you want to start your new recording from the end of a tape that has an END ID, load the tape and press ⏺. The DTR-80P will automatically stop just before the END ID.

4 Press ⏺ to enter REC PAUSE.

- If the above operation does not cause the program number to appear on the display, you will be able to register a START ID but not a program number. After you finish recording be sure to perform the renumbering operation (page 34) to assign correct program numbers to all selections on the tape.

5 Press ⏯ to start recording.

Other Useful Recording Functions

The features and functions described here are designed to help you make perfect recordings every time.

About the monitor function

Usually, when you press REC PAUSE with a tape loaded in the DTR-80P, REC PAUSE is entered and you can monitor the signal being input into the DTR-80P. If you leave the DTR-80P in REC PAUSE for about 5 minutes without performing any other operation, however, REC PAUSE is automatically cancelled in order to avoid damaging the tape.
The monitor function lets you monitor input without a tape loaded in the DTR-80P. Because there is no worry of tape damage, the monitor function is not cancelled automatically even if you use it for longer than 5 minutes. You can also use the monitor function to input an analog signal into the DTR-80P and output it through the DTR-80P's digital terminal. Conversely, you can also convert a digital signal to an analog signal.

To use the monitor function

1 Connect a device to the DTR-80P (page 13).

2 Set the **MIC/LINE** selector and **INPUT** selector in accordance with the type of input you are going to monitor (page 18).

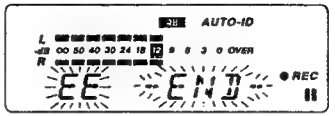
3 Switch DTR-80P power on, and confirm that there is no tape loaded. If a tape is loaded in the DTR-80P, press ⏏ and remove the tape.

4 Press REC PAUSE.

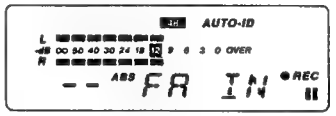
- When the **INPUT** selector is set to MIC/LINE, the message "AD/DA" appears on the display about one second after the "ANALG" message. This indicates that the monitor function is activated, and that you can adjust the recording level (page 22.).
- When the **INPUT** selector is set to OPTICAL or COAXIAL, the message "AD/DA" appears on the display about one second after the "DGITL" message. the sampling frequency of the digital signal is also shown on the display.

To fade in on a recording

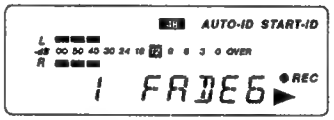
1 While the DTR-80P is in REC PAUSE, hold down MODE for at least one second.



2 Press MODE once again, and the message "FA IN" is on the display.



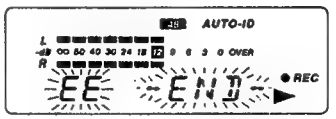
3 Press ⏯, and the DTR-80P will automatically fade into the recording.



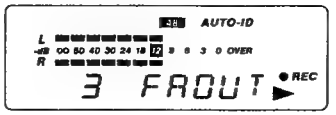
- The display counts down from 9 to 0 indicating the fade in. See the procedure below for details on setting the actual time it takes for the fade in to be performed.
- If you want to cancel the fade in operation while it is in progress, press ⏯. This completes the fade in at very high speed and causes the DTR-80P to go into the record operation.

To fade out from a recording

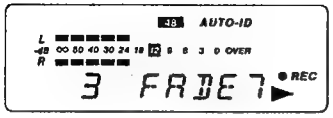
1 While the DTR-80P is recording, hold down MODE for at least one second.



2 Press MODE once again, and the message "FAOUT" is on the display.



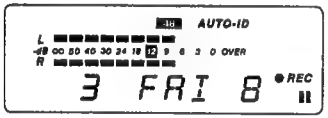
3 Press ⏯, and the DTR-80P will automatically fade out from the recording.



- The display counts down from 9 to 0 indicating the fade out.
- If you want to cancel the fade out operation while it is in progress, press ⏯. This completes the fade out at very high speed and causes the DTR-80P to exit the record operation.

To change the fade time

While either "FA IN" or "FAOUT" is on the display, press ⏮ or ⏭, and the current fade time in seconds appears on the display. Use ⏭ to increase, ⏮ to decrease the fade time within the range of 1 to 10 seconds.



- When you use the fade recording functions of the DTR-80P, the volume of the sound being recorded is sequentially increased (fade in) or decreased (fade out). Depending on recording conditions, this change in volume may be noticeable.

Sub-codes

How the DTR-80P records data

A digital audio tape recorder is capable of recording sub-codes that are separate from the audio data. Sub-codes are used by the recorder to keep track of ABS time, program numbers, and skip play operations. Sub-codes can be registered and edited without affecting the audio data.

About DTR-80P sub-codes

There are 5 types of DTR-80P sub-codes.

ABS Time

ABS sub-codes indicate the total time elapsed from the beginning of the tape. ABS sub-codes are registered automatically, but the following points should be noted.

- When using an unrecorded tape, be sure that it is rewound all the way to the beginning before starting recording.
- When recording over a section of tape that is already recorded, be sure to avoid creating any non-recorded blanks (page 30).

Start ID

Start ID sub-codes indicate the beginning of each selection. These sub-codes can be included automatically when the original recording is made, or they can be added later. See page 31 for details.

Program Number

Program Number sub-codes (registered along with Start ID sub-codes) assign a number to a selection. Properly registered Program Number sub-codes assign numbers sequentially, starting with 1 for the first selection on the tape. See page 34 for details.

End ID

The End ID indicates the end of the recorded portion of the tape. The End ID is always registered manually. See page 35 for details.

TOC (Table of Contents)

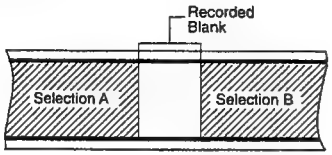
The TOC contains such data as the total number of selections on a tape, the length of each selection, and the total recording time on the tape. See page 36 for details.

About recorded blanks and non-recorded blanks

Since the sub-code data is independent of the audio data, a DAT recorder can produce two types of blank spaces: ***recorded blanks*** (sub-code data only) and ***non-recorded blanks*** (no data).

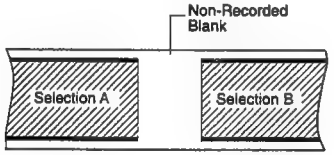
Recorded Blank

A ***recorded blank*** is one that contains sub-code data but no sound data.



Non-Recorded Blank

A ***non-recorded blank*** is one that contains neither sub-code data nor sound data.



As you can see, the non-recorded blank has a break in the sub-code data, so the DAT recorder cannot keep track of the ABS time correctly. Because of this, you should always avoid creating non-recorded blanks on your tapes.

How to avoid non-recorded blanks

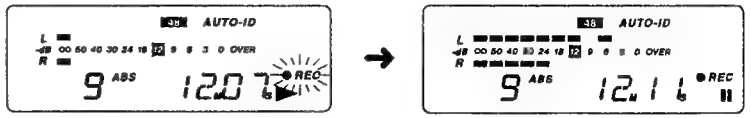
- Use the procedures described below to create recorded blank trailers at the end of recordings. To continue recording on such a tape, go to the recorded blank trailer and start the new recording from there. Before you start recording, check to see that the ABS time is displayed. If it is, the unit is picking up the sub-code data from the previous recording and will automatically continue the sub-code track without a break.
- An End ID at the end of the recorded portion of a tape is also useful for avoiding non-recorded blanks (see page 35).

To create a recorded blank (REC/ REC MUTE)

By using REC/REC MUTE, you can create a recorded blank space in any portion of the tape.

To create a 4-second blank between selections

While a recording is in progress or while the DTR-80P is in REC PAUSE, press REC/REC MUTE to create a 4-second recorded blank on the tape. After the DTR-80P inserts the blank, it goes into REC PAUSE.



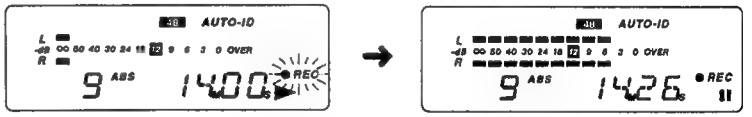
- The ●REC indicator flashes on the display while the blank is being inserted.
- You cannot insert a blank while a Start ID is being recorded.

To create a shorter blank between selections and go into recording

While a recording is in progress or while the DTR-80P is in REC PAUSE, press REC/REC MUTE once to start the blank and then press ▶II when you want the blank to end. The DTR-80P will start recording.

To create a longer blank between selections

While a recording is in progress or while the DTR-80P is in REC PAUSE, hold down REC/REC MUTE to create a recorded blank. The blank will continue until you release REC/REC MUTE. After the DTR-80P inserts the blank, it goes into REC PAUSE.



Registering Start IDs

Start IDs are used to mark a point on the tape as a start point. Then when you use the DTR-80P's high-speed search function, you can quickly move to any Start ID.

- Registration of a Start ID takes 9 seconds (18 seconds in the LP mode). When registering or playing back a Start ID, the "START-ID" indicator will appear on the display.
- The Program Number is incremented automatically each time a Start ID is registered during recording.

To register a Start ID during recording with AUTO-ID

A Start ID is registered automatically whenever you start recording of a new selection. You can switch the AUTO-ID function on and off by pressing MODE while the DTR-80P is in REC PAUSE. The "AUTO-ID" indicator is shown on the display while the AUTO-ID function is on.

While AUTO-ID is on, the DTR-80P automatically registers a Start ID whenever it picks up a sound louder than –40 dB following a period of silence (below –40 dB) at least 3 seconds long.

To register a Start ID during recording without AUTO-ID

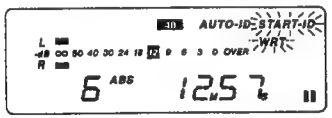
You can register Start IDs manually while AUTO-ID is switched off (no AUTO-ID indicator on the display). A Start ID is registered whenever you press ⏺/⏭.

- When you record a digital signal directly from another DAT recorder, the Start ID sub-codes on the original tape are also recorded.
- When the AUTO-ID indicator is not displayed, you can register a Start ID for any selection that is longer than 12 seconds (24 seconds in the case of LP mode). For best results, however, we highly recommend that you allow at least 20 seconds (40 seconds in the case of LP mode) of tape between the starting points of any two Start IDs.

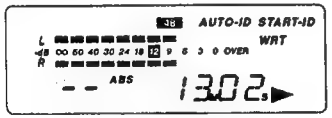
To register a Start ID during playback

You can also register Start IDs during playback. Start IDs can be registered anywhere on the tape except inside of other Start IDs.

1 During playback, press MODE to enter the START ID WRT (write) mode.



2 When playback reaches the point where you want to register a Start ID, press ⏯ to register the ID. After registering the ID, the DTR-80P returns to normal playback.



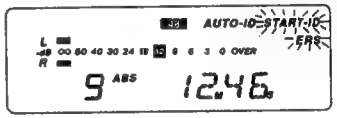
NOTES

- Once registration of a Start ID begins, you cannot register another Start ID for about 12 seconds (24 seconds in the case of LP playback).
- The sound of the playback is cut off while a Start ID is being registered during LP playback.
- When you register a Start ID during playback, the corresponding program number is not registered. Be sure to follow the above operation by the renumber operation (see page 34).

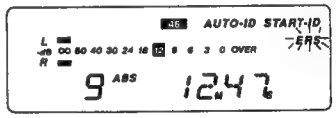
To delete a Start ID

1 Use the skip play operation (page 39) to search for the Start ID you want to delete. Stop playback anywhere just before the ID to be deleted or anywhere within it.

2 Press MODE to enter the START ID DEL (delete) mode.



3 Press ⏯ to delete the Start ID. After deleting the ID, the DTR-80P returns to normal playback.



NOTES

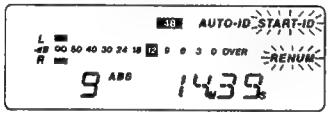
- The sound of the playback is cut off while a Start ID is being deleted during LP playback.
- When you delete a Start ID, the program number sequence on the tape will be out of order. Be sure to follow the above operation by the renumber operation (see page 34).
- If the DTR-80P's head is not located within a Start ID when you press ⏯ in the above sequence, the next Start ID on the tape will be deleted.
- You may experience problems using the above procedure to delete a short Start ID (one whose registration was interrupted for some reason). In such a case, delete the short Start ID by registering a normal length Start ID over it.
- If no Start ID has been registered, search will continue until the end of the tape is reached, and then the tape will automatically rewind and stop.
- Do not press ⏏ while deleting a Start ID.

Renumbering Program Numbers

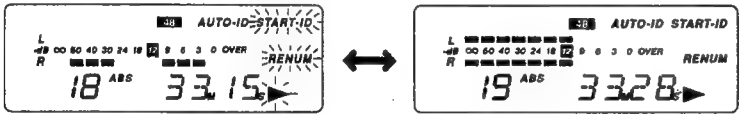
Registering new Start IDs and deleting existing Start IDs cause the program number sequence to be disrupted. Use the renumbering procedure described below to correct the sequence.

To renumber the program numbers

1 Press MODE to enter the START ID RENUM (renumber) mode.



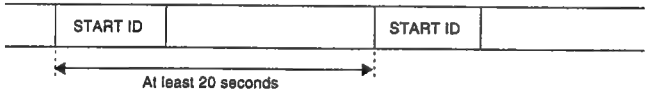
2 Press ⏯ and the DTR-80P automatically returns to the beginning of the tape and then fast forwards through the tape, putting the program numbers into the correct sequence. When the tape reaches the end, it rewinds back to the beginning.



Display during serching

Display during registration

- If there is less than 20 seconds between the start points of Start IDs, the renumbering operation may not work correctly.

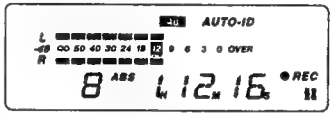


Registering End IDs

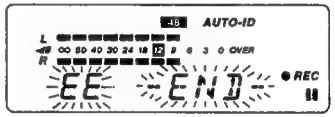
The End ID indicates the end of a recording. If you put an End ID at the end of the last recording you make, you can easily find this point when you want to add more.

To register an End ID

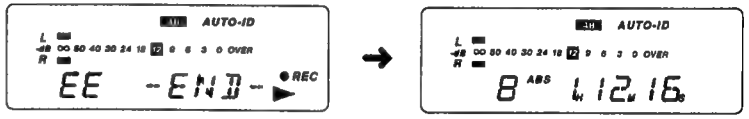
1 When you reach the end of the recording, press REC PAUSE to enter REC PAUSE.



2 Hold down MODE for at least one second.



3 Press ⏯ and the DTR-80P inserts a 9-second recorded blank, which includes the End ID. The DTR-80P then rewinds to the point immediately before the End ID.



Creation of recorded blank, including End ID

Creation of recorded blank complete

To delete an End ID

The End ID sub-code is automatically deleted when recording is resumed from the point marked by the End ID.

Registering Table of Contents (TOC) Data

The TOC contains such data as the total number of selections on a tape, the length of each selection, and the total recording time on the tape. There are two types of TOCs.

R-TOC

This type of TOC is found on pre-recorded DAT tapes and consists of the data recorded throughout the sub-code area on the tape. The DTR-80P automatically reads this data whenever you play back a pre-recorded tape. You cannot register R-TOC sub-codes using the DTR-80P.

U-TOC

This type of TOC can be registered using the DTR-80P. The DTR-80P automatically registers the TOC at the first selection on the tape when you perform the operation described below.

When a tape includes a TOC, you can search for specific selections using their program numbers (see page 41).

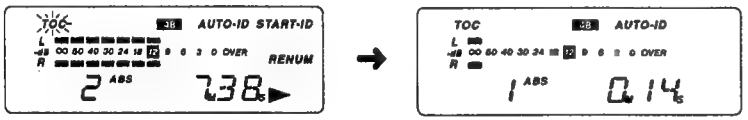
To register TOC data

1 Load the tape on which you want to register TOC data. Make sure that its protect slot is closed.

2 Register an End ID as described on page 35.

- If the tape already has an End ID, press ⏩ to fast forward to the End ID.

3 Perform the renumbering operation described on page 34. Once the renumbering operation is complete, the DTR-80P registers a U-TOC within the Start ID of the first selection on the tape.



- Note that the above operation must start from the End ID of the tape.

Playback Operations

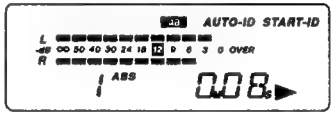
The DTR-80P is capable of playing back digital audio tapes recorded using a number of different sampling frequencies. Playback is adjusted automatically to adapt to the frequency of the tape being used.

To start playback

1 Switch power on.

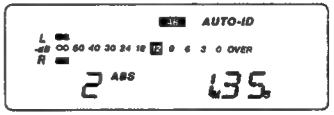
2 Load a DAT cassette into the holder.

3 Press ⏯ to start playback.

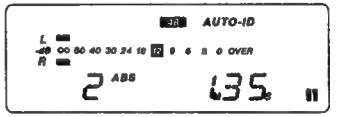


To stop playback

Playback stops as soon as you press ⏹.



You can also stop movement of the tape without exiting playback by pressing ⏯ (PAUSE).



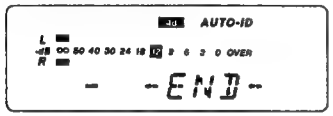
To resume playback from the PAUSE, press ⏯ again.

- If the pause mode is set for approximately 5 minutes, the pause mode is automatically cancelled and the stop mode is set.

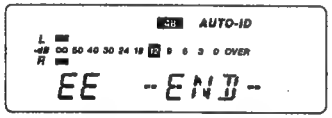
To use fast forward and rewind

While the tape is stopped, press ⏭ to start the fast forward operation and ⏮ for rewind. The fast forward or rewind operation will stop whenever either end of the tape is reached. To manually stop fast forward or rewind, press ⏹.

- The display shows the program number of the selection being passed during the fast forward and rewind operations.
- If a 9-second (or longer) non-recorded blank is encountered during fast-forward, the DTR-80P judges that the recorded part has ended. An "-END-" message appears on the display and the tape will be automatically rewound to the last recorded point.



- If an End ID is encountered during fast forward operation, the message "EE -END-" appears on the display, and the tape is returned to the point immediately preceding the End ID.



To use cue and review

Pressing ⏭ during playback cues forward on the tape, while pressing ⏮ reviews back. During the first five seconds these keys are held down plays the tape back at three times normal speed (double in the LP mode). After five seconds, the speed increases even more.

During cue and review, you can hear the contents of the tape played back at about one fourth normal volume.

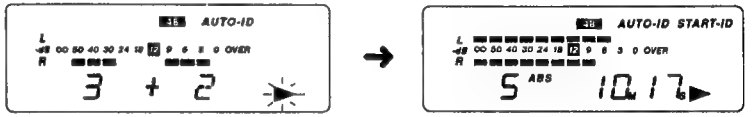
Playback Variations

Using the Automatic Search Function

During playback, stop or pause, you can "skip" forward or back to other selections by pressing ⏭ or ⏮.

To skip from selection 3 to selection 5

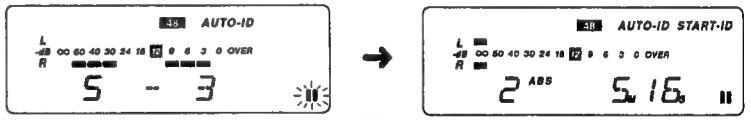
While selection 3 is playing, press ⏭ 2 times. Playback will skip forward to the beginning of selection number 5.



You can skip up to 15 selections.

To skip from selection 5 to selection 3

While selection 5 is playing, press ⏮ 3 times. Playback will skip back to the beginning of selection number 3.



- The first time ⏮ is pressed, playback skips to the beginning of the selection presently in play.
- Note that you can perform a skip either while the tape is playing back or while playback is paused. In the above example for skipping from selection 3 to selection 5, the skip operation is started during palyback, so playback is resumed when selection 5 is found. In the example for skipping from selection 5 to selection 3, the operation starts from a pause, so the DTR-80P enters into a pause after it finds selection 3.

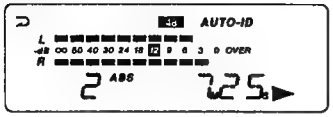
Using Repeat Play

The repeat play capabilities of the DTR-80P let you repeat all of the selections on a tape or any single selection up to 15 times.

To repeat all selections on the tape

1 Press ⏯ to start playback of a tape. It makes no difference what selection on the tape is playing.

2 Hold down MODE until the repeat indicator appears on the display (about one second).



- The above operation causes the entire area from the beginning of the tape up to the end of recording (page 35) to be repeated up to 15 times.

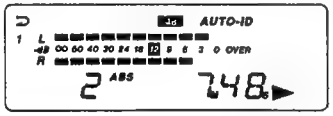
To repeat a specific selection

1 Start playback of the selection you want to repeat.

2 Hold down MODE until the repeat indicator appears on the display (about one second).

- If you want to repeat play the first selection on the tape, wait until the START ID indicator appears on the display before you hold down MODE button.

3 Press MODE again and the single selection repeat indicator appears on the display. The selection can be repeated up to 15 times.



To cancel repeat play

While repeat play is being performed, press MODE. The repeat indicator (if you are repeating the entire tape) or the single selection repeat indicator (if you are repeating a specific selection) clears from the display, indicating that the corresponding repeat operation is cancelled.

NOTES

- You can also cancel repeat play by pressing ⏮, ⏭, ⏪, or ⏩.
- The repeat operation is performed from one Start ID to the next. For best results, however, we highly recommend that you allow at least 20 seconds of tape (40 seconds for the LP mode) between the starting points of any two Start IDs (page 34).
- You cannot perform repeat playback within a non-recorded blank.

Auto Rewind

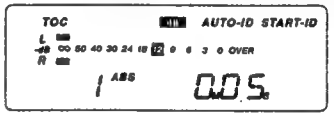
Whenever the DTR-80P reaches an End ID or a non-recorded blank up to 9 seconds long (18 seconds in the LP mode) during playback, recording, forward skip, or search operations, it automatically rewinds back to the beginning of the tape. Note that the Auto Rewind function does not operate during fast forward operation.

Using Program Number Search

You can use the following procedure to search for specific selections according to their program numbers. You can perform program number search only with tapes that have a Table of Contents (TOC). See page 36 for details on creating a TOC.

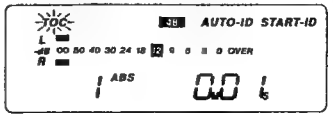
To perform program number search

1 Check the display of the DTR-80P. If the "TOC" indicator is not shown, rewind the tape back to the beginning and then start playback. Once you see the "TOC" indicator on the display, press ⏏ to stop playback.



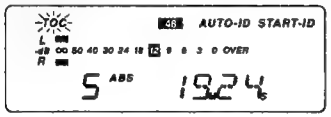
- At this point you can show the TOC data on the display using the procedures described on page 36.

2 While the tape is stopped, hold down MODE until the "TOC" indicator begins to flash on the display.

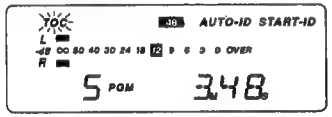


3 Specify the program number of the selection you want. Press ⏭ to increase the currently selected program number or ⏮ to decrease it.

- Now the "ABS" indicator appears on the display, along with the location of the selection whose program number is displayed. The location is indicated as the amount of time (TOC ABS time) from the beginning of the tape.

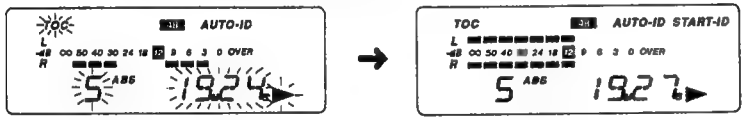


- If you press TIME/LIGHT once, the "PGM" indicator to appear along with the total playing time (TOC PGM time) of the selection whose program number is shown on the display.



- The TOC PGM time is always displayed for the SP mode. You should double this value to convert playing times in the LP mode.

4 After you display the program number of the selection you want, press ⏯ to search for and start playback of the selection.



- The entire display flashes during the search operation.

Changing the Time Counter

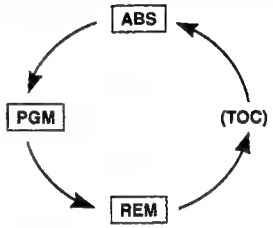
Each time you press TIME/LIGHT, the time counter changes in the sequence illustrated below. The type of display that you select is retained even if you switch off the power of the DTR-80P.

ABS (Absolute Time)
This display shows the elapsed time from the beginning of the tape.

PGM (Program Time)
This display shows the elapsed time from the beginning of a selection.

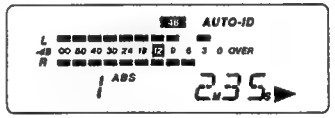
REM (Remaining Time)
This display shows the time remaining on a tape.

TOC (Table of Contents)
This display shows the total number of selections on a tape along with the total play time.



ABS (Absolute time)

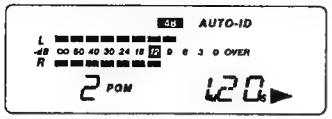
Press TIME/LIGHT so that ABS is selected.
In this case, the display shows that 2 minutes and 35 seconds have elapsed since the beginning of the tape.



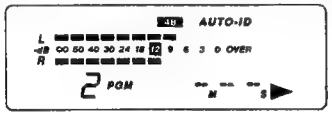
ABS indicates total elapsed time from the beginning of the tape. When using a new tape, be sure to rewind it all the way to the beginning before recording. If the tape is not rewound, ABS will not be registered.

PGM (Program time)

Press TIME/LIGHT so that PGM is selected. This indicates that 1 minute and 20 seconds have elapsed in the presently selected program (selection).



Note that program time is displayed when a program is played back from its beginning (Start ID). PGM time is not displayed if the Cue/Review, FF or rewind functions are used to start playback in the middle of a selection.

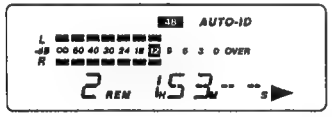


REM (Remaining time)

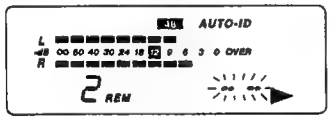
(display mode: stop, play, pause, recording)

Press TIME/LIGHT so that REM is selected. In this case, the display shows that 1 hour and 53 minutes remain on the tape.

Note that the REM value can be displayed only during playback and recording, or while the tape is stopped or paused during playback or recording.



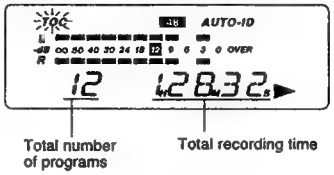
Display appears approximately 10 or 15 seconds after beginning of play/recording, as time is required for calculation. During calculation time, a flashing "– –" mark appears in the display.



The REM time on the TOC display shows hours, minutes, and seconds remaining.

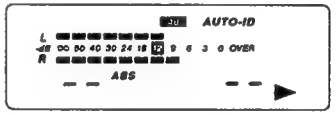
TOC (Table of contents)

Press TIME/LIGHT once again when the REM time is displayed. The TOC display will appear, showing the total number of programs and the total recording time of the tape. After three seconds, the Time Counter automatically switches to the ABS display.
This function is available only with tapes that contain TOC data. If there is no TOC registered on the tape, the display will switch to the ABS display.



NOTE

When ABS or PGM displays are selected, the display appears as shown below if a non-recorded section of tape is encountered during playback.



About Digital Recording Restrictions

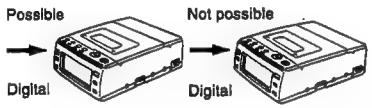
This unit adopts the Serial Copy Management System (SCMS). Unlike previous systems, the SCMS standard limits direct recording from most digital sources to first generation copies (1-time recording only).

The following shows the restrictions on digital recording that are imposed by the SCMS standard of the DTR-80P.

Recording from digital sources with copyright protection codes

First-generation copies only are possible from this type of source, and the tape created cannot be used as the source for direct digital recording. Trying to copy such a tape causes the message "PROHB" to appear on the display, indicating that further direct digital copying is prohibited.

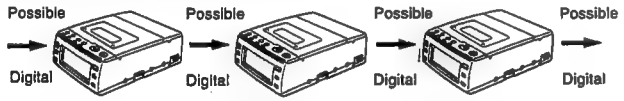
- CD
- DAT pre-recorded tape
- Other digital sources



Recording from digital sources without copyright protection codes

Unlimited copies are possible from this type of source.

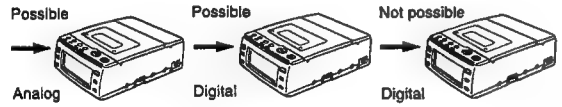
- Digital microphone
- Other digital sources



Source tape recorded from analog input

Tapes recorded from analog input (including privately recorded tapes) are treated as digital sources with copyright protection codes. This means that copying is limited to the first generation.

- CD
- DAT tape
- FM tuner
- Other analog sources



If the "PROHB" message appears on the display telling you that direct digital recording is impossible, you can still record by switching to analog input.

Troubleshooting

Problem	Probable cause	Remedy
No power	1. AC adapter's plug is unplugged. 2. Batteries in alkali battery pack are worn.	1. Plug the plug into an outlet. 2. Replace all the batteries with new ones.
Controls do not operate.	1. Cassette not inserted. 2. Not operable for 5 seconds after power on. 3. HOLD switched on. 4. Condensation.	1. Insert cassette. 2. Wait 5 seconds after power on. 3. Slide HOLD switch to left (HOLD off). 4. Wait 1 to 2 hours before operating.
• **Recording impossible.** • **"NO REC" message on display while REC/ REC MUTE button is depressed.** • **Pressing does not enter sub-code editing mode.**	1. Erase protect slot open. 2. Pre-recorded tape loaded in DTR-80P.	1. Close erase protect slot. 2. Use different tape.
No sound recorded by record operation.	1. REC LEVEL too low. 2. Incorrect input selector settings. 3. Wrong or incomplete connections.	1. Raise recording level. 2. Correct settings (see pages 18 - 22) 3. Make connections that match type of recording being performed. Insert plugs securely as far as they will go.
All sampling frequencies (32 kHz, 44.1 kHz, 48 kHz) flashing on display. Cannot record digital signal.	1. INPUT selector position does not match type of recording being performed. 2. Analog signal being supplied from source. 3. Signal incompatible with DTR-80P detected.	1. Correctly set INPUT selector to OPTICAL or COAXIAL to match recording being performed. 2. Perform analog recording according to instructions under "Making Analog Recordings" on page 18. 3. Check source and make necessary adjustments, if possible, or perform analog recording according to instructions under "Making Analog Recordings" on page 18.
"PROHB" displayed. Cannot record digital signal.	Digital signal supplied by source is "record-prohibited".	Perform analog recording according to instructions under "Making Analog Recordings" on page 18.
• **Program number does not change with change of selection.** • **Incorrect program number displayed.**	1. No Start ID registered at beginning of selection. 2. Multiple selections recorded under same program number, or program number not registered correctly.	1. Register Start ID at beginning of selection (page 31). 2. Perform renumbering procedure (page 34).

Problem	Probable cause	Remedy
ABS time not displayed.	ABS time not registered.	ABS time cannot be registered after recording. Use tape which has ABS time registration.
Tape skips	1. Tape is old. 2. Heads dirty or worn.	1. Use new tape. 2. Clean unit with head cleaning tape.

If problem persists, contact your authorized DENON representative.

Display Messages

The following messages flash (or light) on the display when the corresponding condition exists.

Display	Cause	Remedy
"-- DEW --"	Condensation	Wait 1 hour or 2 hours before using the unit again (see page 7).
"BATT"	Batteries in alkali battery pack are worn. Rechargeable Ni-cd battery pack (AP-18) insufficiently charged.	Replace all the batteries with new ones. Recharge the AP-18. For instructions on recharging, refer to the operating instructions of the AP-18.
"HOLD"	HOLD function switched on, which deactivates all operation buttons.	Slide HOLD switch to left (HOLD off).
"AD/DA"	Monitor function switched on (page 26).	Press ⏭ to switch monitor function off.

Specifications

Tape:	DAT cassette tape
Tape speed:	SP : 8.15 mm/s Wide-track playback: 12.23 mm/s LP : 4.075 mm/s
Recording time:	SP : 120 minutes continuous LP : 240 minutes continuous (with 120-minute tape)
Head:	Dual rotary
Drum speed:	SP : 2,000 rpm LP : 1,000 rpm (recording) 2,000 rpm (playback)
Track pitch:	13.6 μm (20.4 μm for wide-track)
Sampling frequencies:	48 kHz, 44.1 kHz, 32 kHz
Quantization:	SP : 16-bit linear LP : 12-bit non-linear
Modulation:	8 – 10
Number of channels:	2-channel stereo
Frequency responses:	fs 48 kHz: 10 Hz to 22,000 Hz (±1 dB) fs 44.1 kHz: 10 Hz to 20,000 Hz (±1 dB) fs 32 kHz: 10 Hz to 14,500 Hz (±1 dB)
SN ratio:	SP : 90 dB LP : 88 dB
Dynamic range:	SP : 90 dB LP : 88 dB
Total harmonic distortion:	SP : 0.008% (1 kHz) LP : 0.06% (1 kHz)
Wow and flutter:	Less than measurable range (±0.001% W.PEAK)
Emphasis:	Recording : OFF Playback : ON/OFF auto switching (time constant 15/50 μs)
Rewind time:	Approximately 70 seconds (120-minute tape)
Auto Power Off:	Approximately 6 minutes after last operation.
Terminals:	
ANALOG IN (MIC/LINE)	LINE: 200 mV (0 dB) Input impedance: 47 kΩ MIC: 3 mV (0 dB) Input impedance: 10 kΩ, stereo mini-jack
LINE OUT	1 V (0 dB) Output impedance : 300 Ω, stereo mini-jack

PHONES	0 to 20 mW Load impedance: 32Ω, stereo mini-jack
DIGITAL IN/OUT	0.5Vp-p Load impedance: 75 Ω, stereo mini-jack
OPTICAL IN	Optical connector
Power supply:	Four power supplies: AC adapter: AA-9 (included) Alkali battery pack: AP-20 (included) Rechargeable Ni-cd battery pack: AP-18 (sold separately) Car battery adapter: AP-19 (sold separately)
Power consumption:	3.8 W on alkali battery pack: Approximately 4 hours playback, approximately 3.5 hours recording
Dimensions:	3-1/2"(W)×4-11/16"(D)×1-9/16"(H) (main unit only) 90(W) × 119(D) × 39.5(H) mm 3-1/2"(W)×6-19/32"(D)×1-9/16"(H) (with battery pack) 90(W) × 167.5(D) × 39.5(H) mm
Weight:	Approximately 13.8 oz (390 g) (main unit only) Approximately 20.8 oz (590 g) (With six alkali batteries set in alkali battery pack)
Accessories:	AC adaptor, 2 connecting cords Alkali battery pack Six alkali batteries

Designs and specifications are subject to change without notice.

FCC WARNING

GUIDELINES LAID DOWN BY FCC RULES FOR USE OF THE UNIT IN THE U.S.A. (not applicable to other areas).

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ....reorient the receiving antenna
- ....relocate the equipment with respect to the receiver
- ....move the equipment away from the receiver
- ....plug the equipment into a different outlet so that equipment and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems"

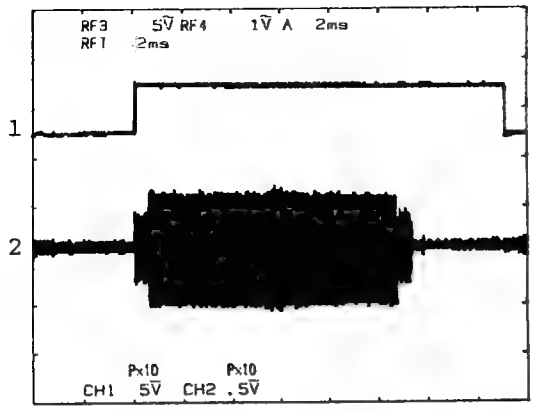
This booklet is available from the US Government Printing Office, Washington D.C., 20402, Stock No.004-000-00345-4.

Note to Canadian customers

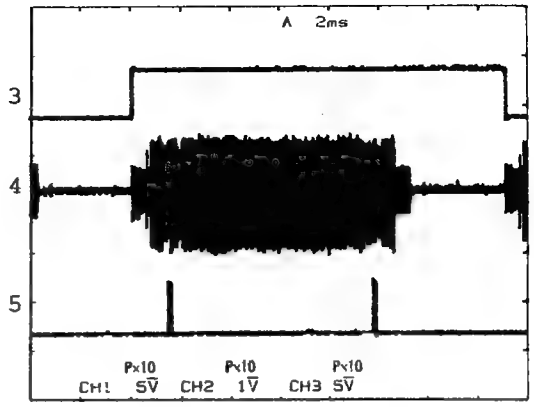
Canadian DOC Regulation

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

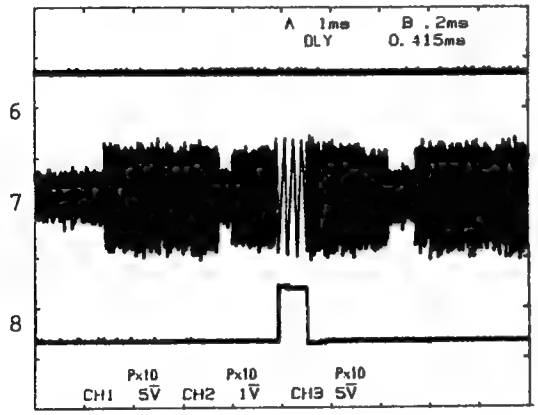
1. MAJOR WAVEFORMS



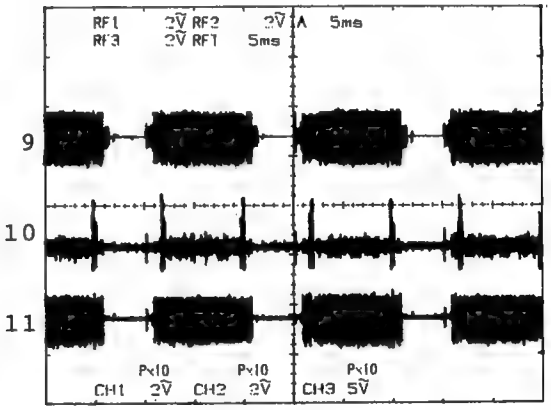
1. Test pad DRMP2(MA2-PCB)
2. Test pad PBD(MA1-PCB)
(TEST MODE of test tape **DAT-ER01**)



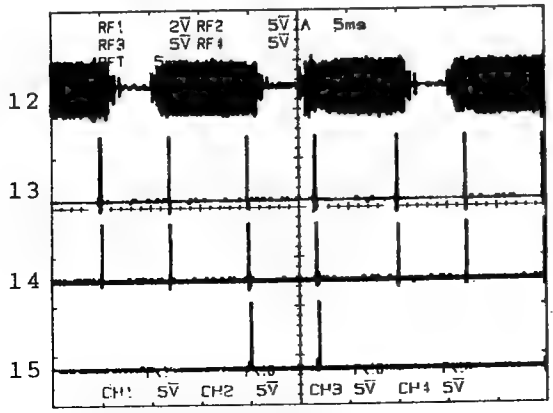
3. Test pad DRMP2
4. Test pad PBD
5. Test pad PIWD(MA2-PCB)
(During play of test tape **DAT-ER01**)



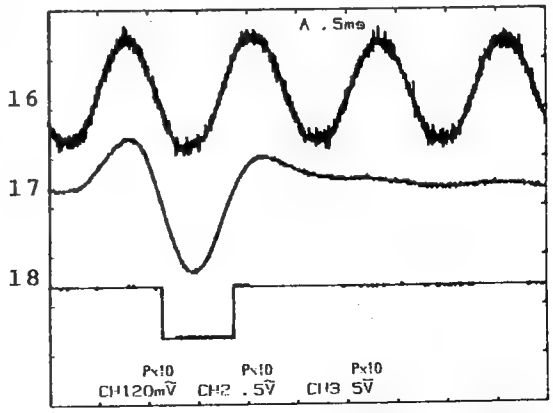
6, 7 and 8 are the expanded waves of 3, 4 and 5 horizontally.
Delay trigger: B trigger area of PIWD.
During play of test tape **DAT-ER01**



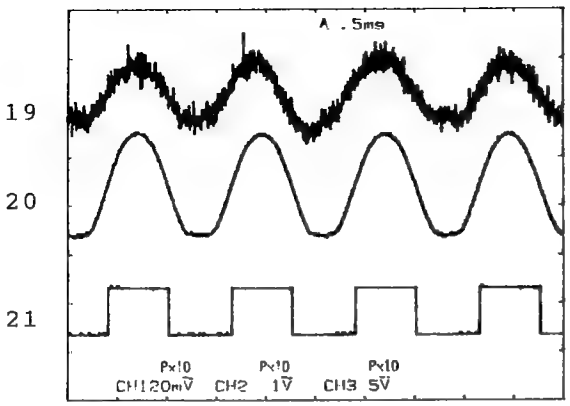
9. Test pad PBD
10. PILOT signal(MSM6557 pin 60)
11. SYNC signal(MSM6556 pin 56)
(During play of test tape **DAT-ER01**)



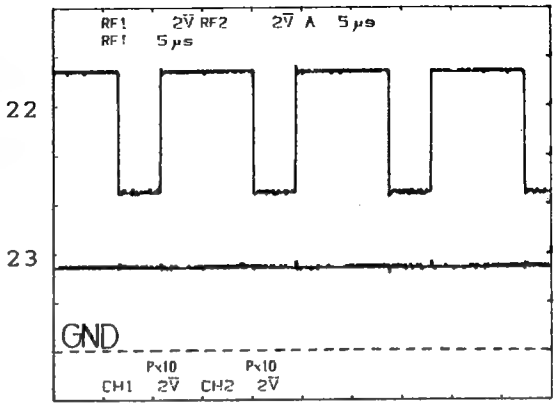
12. Test pad PBD
13. SH1(MSM6556 pin 77)
14. SH2(MSM6556 pin 78)
15. SH3(MSM6556 pin 79)



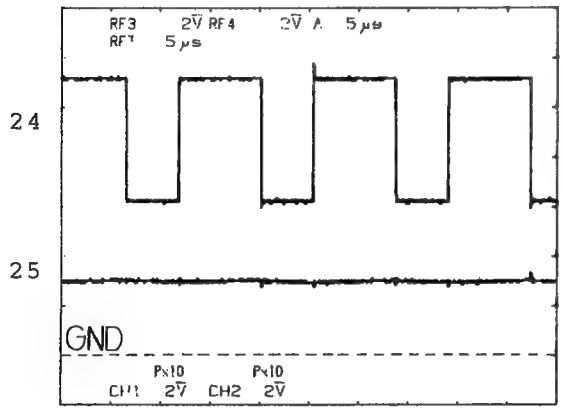
16. Cylinder PG sensor output (CN-5 pin 3)
17. Cylinder PG AMP output (IC208 pin 1)
18. Cylinder PG comparator output (IC205 pin 1)



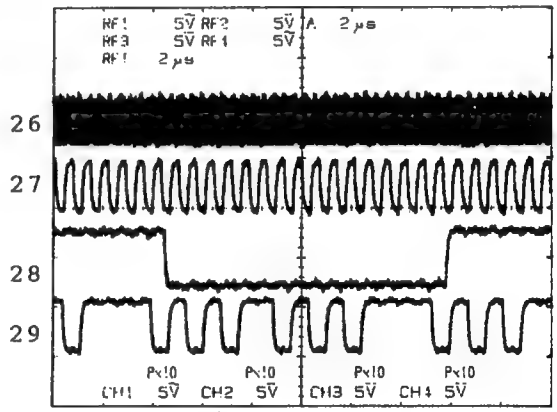
19. Cylinder FG sensor output (CN-5 pin 4)
20. Cylinder FG AMP output (IC208 pin 7)
21. Cylinder FG comparator output (IC205 pin 7)



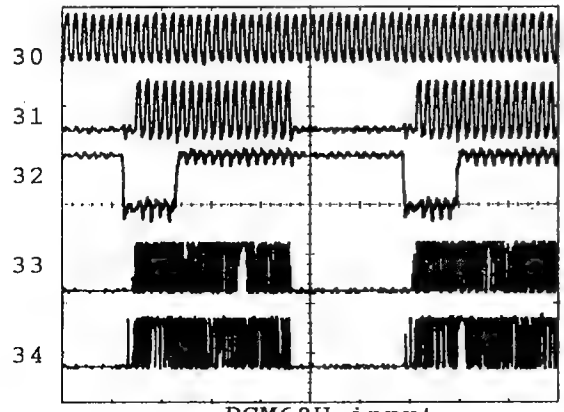
22. Drum turning control signal output(MSM6557 pin 39)
23. Integrating circuit output of drum turning control signal (During play at SP mode)



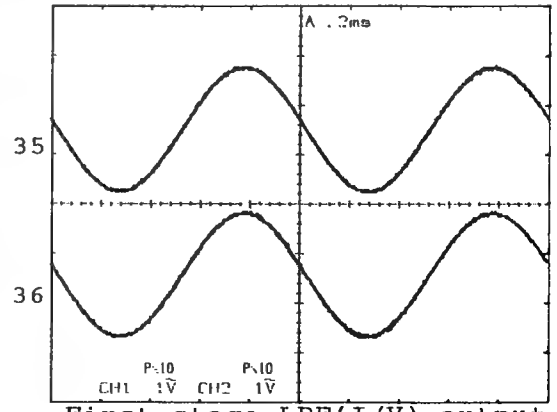
24. Drum turning control signal output(MSM6557 pin 39)
25. Integrating circuit output of drum turning control signal (During recording at LP MODE)



SM5840 input
26. CKI(SM5840 pin 2)
27. BCKI(SM5840 pin 21)
28. LRCI(SM5840 pin 20)
29. DIN(SM5840 pin 22)
(During play of test tape **DAT-ER01**)

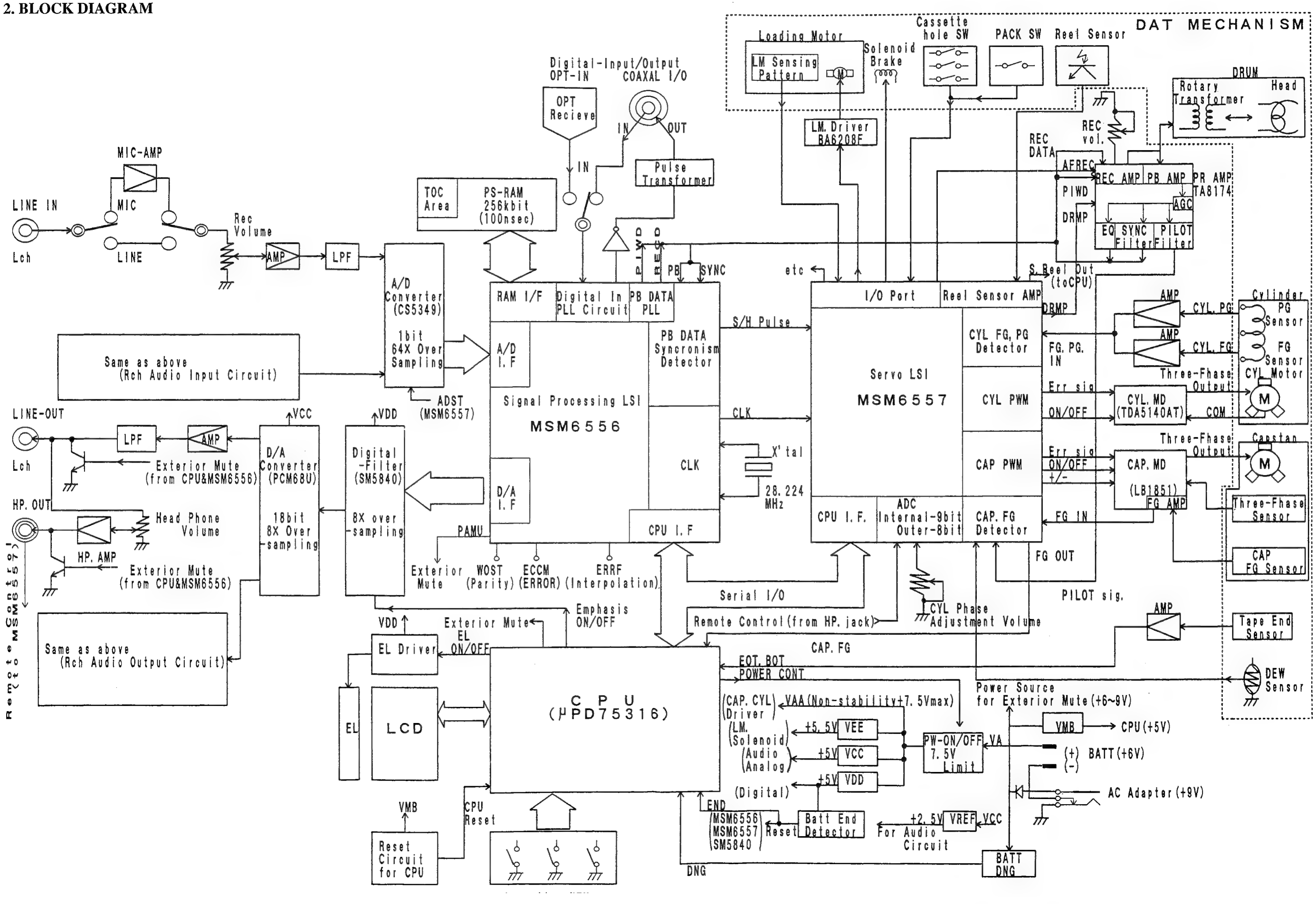


PCM68U input
30. CLK(PCM68U pin 15)
31. BCK(PCM68U pin 14)
32. WDCK(PCM68U pin 16)
33. DATAR(PCM68U pin 13)
34. DATAL(PCM68U pin 17)
(During play of test tape **DAT-ER01**)



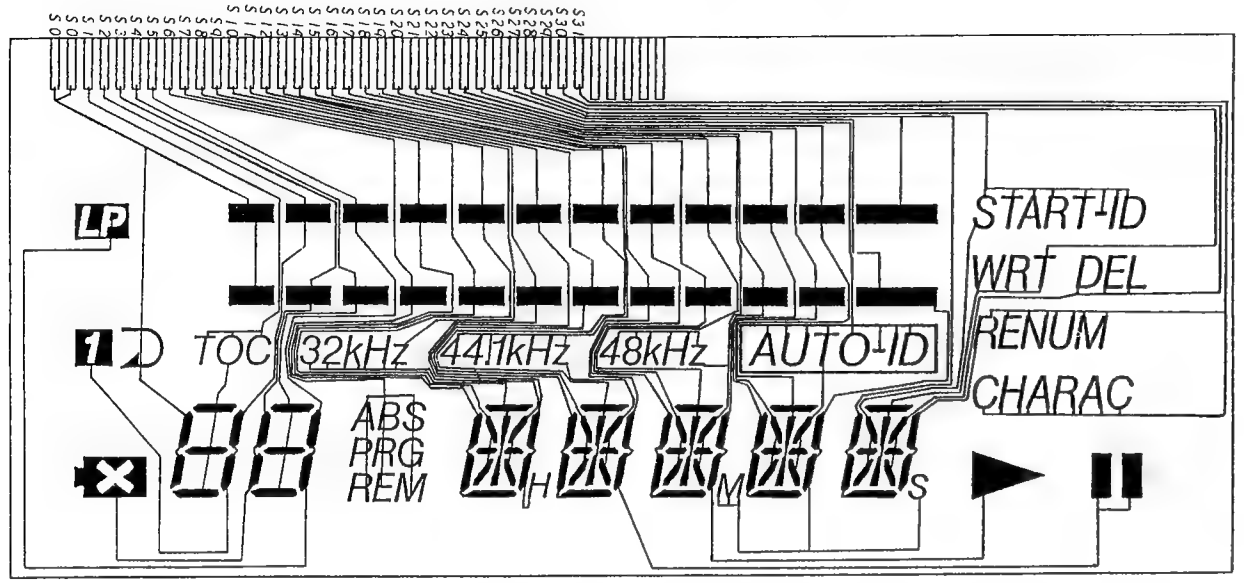
First stage LPF(I/V) output
35. R-ch(IC508 pin 1)
36. L-ch(IC507 pin 1)

2. BLOCK DIAGRAM

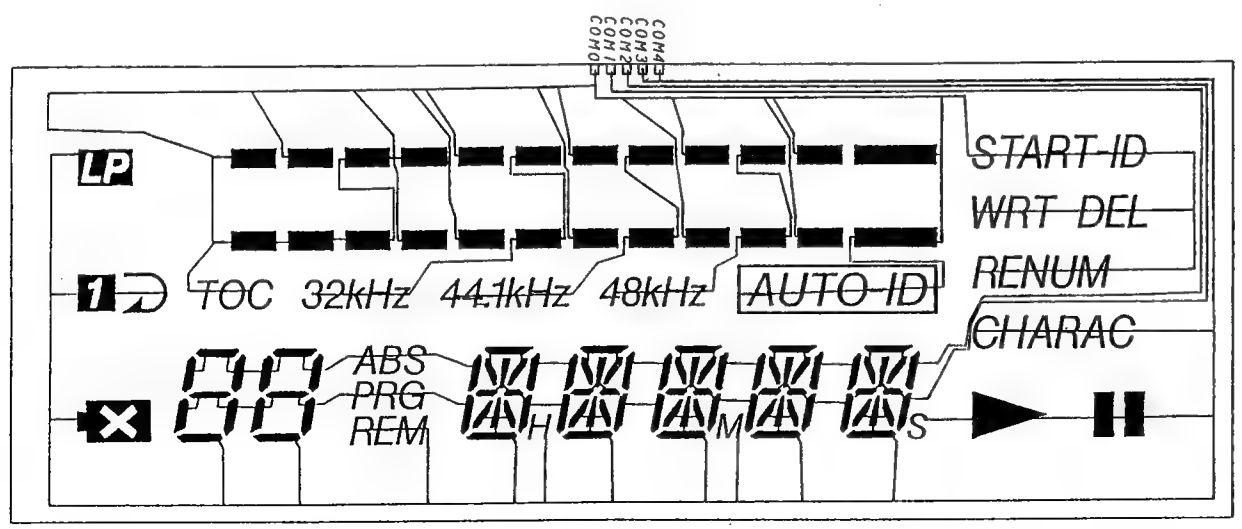


3. LCD MATRIX

3-1. SEGMENT



3-2. COMMON



4. LSI AND IC FUNCTIONS

4-1. μPD75316(CPU)

- Controls Servo LSI(MSM6556) and Signal Processing LSI(MSM6557)
- Drives LCD
- Controls keys
- Controls mute circuit
- Detects tape start/end

4-2. MSM6556(Signal Processing LSI)

- 8 to 10 bit moduration/demodulation
- Data correction circuit
- DA/AD interface
- DAT formater
- Digital I/O interface
- ATF-sync signal detector
- Audio interpolation/attenuation circuit
- Data slicer of playbacked PLL part

4-3. MSM6557(Servo LSI)

- Controls cylinder servo
- Controls capstan servo
- Detects search relative velocity
- Internal A/D converter

4-4. TA8174F(RP AMP)

- Amplifies REC/Playback data
- Equalizes Playback data
- Intrtnal AGC(Auto Gain Control) circuit for playback data
- Detects PILOT/SYNC data

4-5. SM5840(Digital Filter)

- 8 times over sampling
- Controls emphasis of Playback data

4-6. PCM68U(D/A converter)

- 18bit, 8 times over sampling

4-7. CS5349(A/D converter)

- 1bit, 64 times over sampling

4-8. TC51832FL-10(PS-RAM)

- Working area and TOC(Table Of Contents) information

4-9. TDA5140AT

- Drives cylinder motor(Three-Phases circuit)

4-10. LB1851M

- Drives Capstan motor
- Amplifies Capstan FG

5. LSI PIN FUNCTION AND BLOCK DIAGRAM

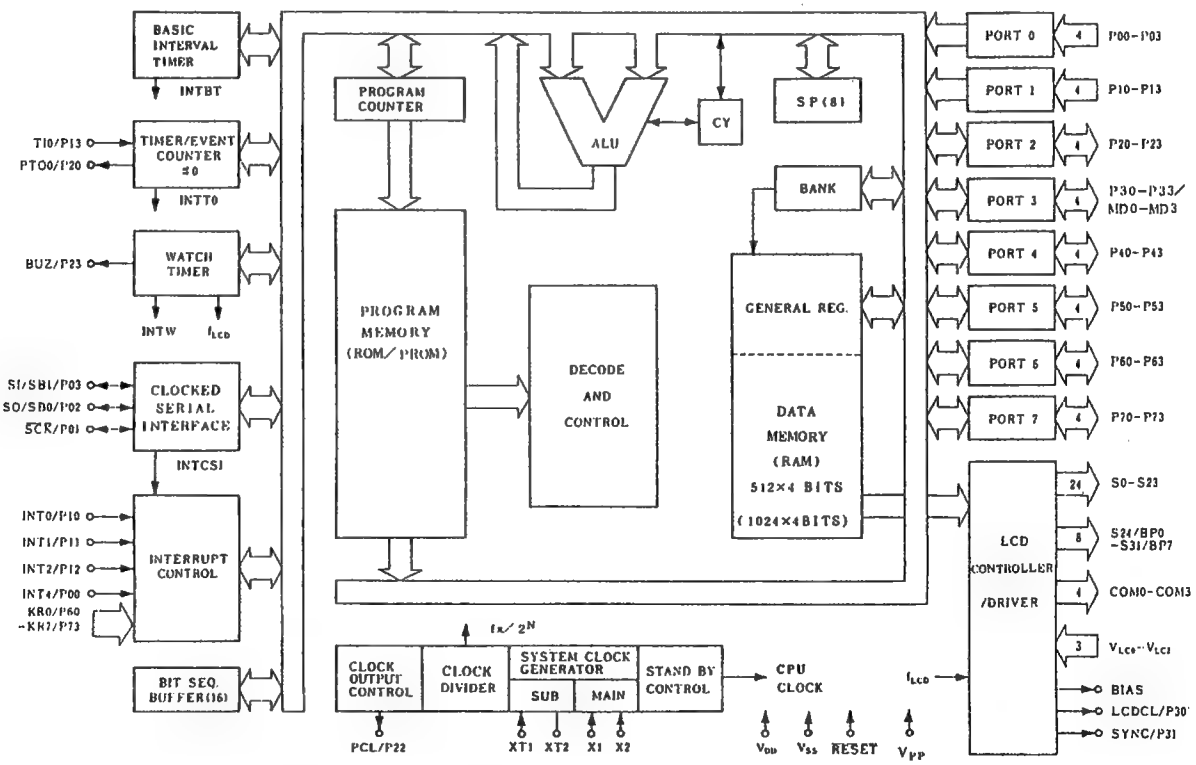
5-1. μPD75316 (CPU)

<table>
<tr><th>Pin No.</th><th>Terminal name</th><th>Type</th><th>Connected to</th><th>Function</th></tr>
<tr><td>1~20</td><td>S12~S31</td><td>O</td><td rowspan="3">LCD</td><td>LCD segment signal</td></tr>
<tr><td>69~80</td><td>S0~S11</td><td>O</td><td>LCD segment signal</td></tr>
<tr><td>21~80</td><td>COM0~COM3</td><td>I</td><td>LCD common signal</td></tr>
<tr><td>25
26
27
28</td><td>BAIS
VLCD
VLC1
VLC2</td><td></td><td></td><td>Control terminal for LCD drive voltage</td></tr>
<tr><td>29</td><td>P40</td><td>O</td><td>SM5840</td><td>Selection for de-emphasis</td></tr>
<tr><td>30</td><td>P41</td><td>O</td><td>SM5840</td><td>Selection for de-emphasis
<table>
<tr><th colspan="2">Terminal</th><th colspan="2">De-emphasis</th></tr>
<tr><th>P40</th><th>P41</th><th>ON/OFF</th><th>fs</th></tr>
<tr><td>L</td><td>L</td><td>ON</td><td>44.1KHz</td></tr>
<tr><td>L</td><td>H</td><td>ON</td><td>48.1KHz</td></tr>
<tr><td>H</td><td>H</td><td>ON</td><td>32.0KHz</td></tr>
<tr><td>H</td><td>L</td><td>OFF</td><td></td></tr>
</table></td></tr>
<tr><td>31</td><td>P42</td><td>O</td><td>MSM6556</td><td>Data command timing signal</td></tr>
<tr><td>32</td><td>P43</td><td>O</td><td>PW. supply</td><td>Change-over for PW-ON/OFF (L:PW-ON , H:PW-OFF)</td></tr>
<tr><td>33</td><td>VSS</td><td></td><td>GND</td><td></td></tr>
<tr><td>34</td><td>P50</td><td></td><td>NC</td><td></td></tr>
<tr><td>35</td><td>P51</td><td>O</td><td>Tape end sensor</td><td>LED of tape end sensor control signal
Normally:H
Tape end before 5 minutes:L</td></tr>
<tr><td>36</td><td>P52</td><td>O</td><td>Mute circuit</td><td>Exterior mute output</td></tr>
<tr><td>37</td><td>P53</td><td>O</td><td>EL circuit</td><td>Change-over for EL ON/OFF</td></tr>
<tr><td>38</td><td>INT</td><td>I</td><td>MSM6557</td><td>Supply reel FG input</td></tr>
<tr><td>39</td><td>SCK</td><td>O</td><td rowspan="4">MSM6556</td><td>Data timing clock output</td></tr>
<tr><td>40</td><td>SO</td><td>O</td><td>Data output</td></tr>
<tr><td>41</td><td>SI</td><td>I</td><td>Data input</td></tr>
<tr><td>42</td><td>INT0</td><td>I</td><td>Data input/output timing signal input</td></tr>
<tr><td>43</td><td>INT1</td><td>I</td><td>SW1</td><td>PW button input</td></tr>
<tr><td>44</td><td>INT2</td><td>I</td><td>MEMBER SW</td><td>EJECT/STOP button input</td></tr>
<tr><td>45</td><td>TI0</td><td>I</td><td>MSM6557</td><td>Capstan FG input</td></tr>
<tr><td>46</td><td>P20</td><td>I</td><td>RH5VA43AA</td><td>Power-Down signal input from power supply circuit</td></tr>
<tr><td>47</td><td>P21</td><td>I</td><td rowspan="2">SW1</td><td>LP/SP button input</td></tr>
<tr><td>48</td><td>P22</td><td>I</td><td>HOLD button input</td></tr>
<tr><td>49</td><td>P23</td><td>I</td><td>SW101</td><td>Change-over signal input for Analog/Coaxal
Analog In:L
Coaxal/Digital In:H</td></tr>
<tr><td>50</td><td>P30</td><td>I</td><td>SW402</td><td>Change-over signal input for time indication</td></tr>
<tr><td>51</td><td>P31</td><td>I</td><td>SW403</td><td>PLAY/PAUSE button input</td></tr>
<tr><td>52</td><td>P32</td><td>I</td><td>SW404</td><td>REW button input</td></tr>
<tr><td>53</td><td>P33</td><td>I</td><td>SW405</td><td>FF button input</td></tr>
<tr><td>54</td><td>VDD</td><td></td><td rowspan="2">VMB</td><td></td></tr>
<tr><td>55</td><td>XT1</td><td></td><td></td></tr>
<tr><td>56</td><td>XT2</td><td></td><td>NC</td><td></td></tr>
</table>

(μPD75316)

Pin No.	Terminal name	Type	Connected to	Function
57	VDD		VMB	
58	X1	I	X'tal	Clock input (4.19MHz)
59	X2	O	X'tal	Clock output (4.19MHz)
60	P60	I	SW406	SKIP+ button input
61	P61	I	SW407	SKIP- button input
62	P62	I	SW408	REC button input
63	P63	I	SW409	MODE button input
64	P70	I	MSM6556	Forced exterior mute signal output
65	P71	I	Sensor	BOT (Beginning Of Tape) signal input
66	P72	I	Power supply	DNG signal input
67	P73	I	Sensor	EOT (End Of Tape) signal input
68	RESET	I	Reset circuit	RESET signal input

—BLOCK DIAGRAM (CPU) —



5-2. MSM6556 (Signal Processing LSI)

Pin No.	Terminal name	Type	Connected to	Function
1	GND1		GND	
2	XTO	O	X'tal	Master clock output (28.224MHz)
3	XTI	I	X'tal	Master clock input (28.224MHz)
4	VDD1		VDD	
5	RA14	O	RAM	Address bus for RAM
6	WE	O		WE signal for RAM
7	RA12	O		Address bus for RAM
8	RA13	O		Address bus for RAM
9	RA7	O		Address bus for RAM
10	RA8	O		Address bus for RAM
11	RA6	O		Address bus for RAM
12	RA9	O		Address bus for RAM
13	RA5	O		Address bus for RAM
14	RA11	O		Address bus for RAM
15	RA4	O		Address bus for RAM
16	OE	O		OE signal for RAM
17	RA3	O		Address bus for RAM
18	RA10	O		Address bus for RAM
19	RA2	O		Address bus for RAM
20	CE	O		CE signal for RAM
21	RA1	O		Address bus for RAM
22	RD7	I/O		Data bus for RAM
23	RA0	O		Address bus for RAM
24	RD6	I/O		Data bus for RAM
25	RD0	I/O		Data bus for RAM
26	RD5	I/O		Data bus for RAM
27	RD1	I/O		Data bus for RAM
28	RD4	I/O		Data bus for RAM
29	RD2	I/O		Data bus for RAM
30	RD3	I/O		Data bus for RAM
31	DOUT	O	Digital I/O terminal	Digital interface signal output
32	GND2		GND	
33	VCC1		VDD	Power source for digital interface signal input
34	DIN1	I	Digital I/O terminal	Digital interface signal input (200mV p-p)
35	DIN0	O		Contorols digital interface input level
36	VSS1		GND	GND for digital interface signal input
37	VSS2			GND for VCO1
38	VCO11	I/O		Frequency control voltage input for VCO1
39	VCO1R			Center frequency creation terminal for VCO1
40	VCC2		VDD	Power source for VCO1
41	GND3		GND	
42	RFS	O		FS output (for exterior PLL2)
43	VCO1IO	I/O		Input mode:Exterior VCO clock input of DIN1 Output mode:Clock output of VCO1
44	PIWD	O	TA8174	Pilot area signal output (H=Pilot area)
45	RECD	O		Recording signal output
46	RPSW	O		Recording control signal output

(MSM6556)

Pin No.	Terminal name	Type	Connected to	Function
47	AZSYNC	I/O	MSM6556	Frame timing signal
48	ERRF	O		DA-Interpolating data output terminal
49	ECCM	O		C1/C2-ERROR signal output terminal
50	WOST	O		Block-sync detection signal output terminal
51	VCO3IO	I/O	NC	
52	VDD2		VDD	Power source for logic circuit
53	VSS3		GND	GND for analog circuit
54	PBD	I	TA8174	Playbacked data input
55	PBR	O		Controls playbacked data input level
56	PBS	I	TA8174	Playbacked ATF-sync signal input
57	PBSR	O		Controls playbacked ATF-sync signal input level
58	VCC2		VDD	Power source for analog circuit
59	VSS4		GND	GND for VCO3
60	VCO3I	I		VCO3-frequency control voltage input terminal (VCO3:For sample playback data clock)
61	VCO3R			Center frequency creation terminal for VCO3
62	NC3		NC	
63	VCC4		VDD	Power source for VCO2•VCO3
64	MUTRST	I	MSM6557	Panic mute cancellation signal
65	VCO2R			Center frequency creation terminal for VCO2
66	VCO2I	I/O		•VCO2-frequency control voltage input terminal •Phase error current output terminal (VCO2:Clock for D/A operation)
67	VSS5		GND	GND for VCO2
68	FILT			Internal filter gain adjustment terminal
69	XT2I	I	MSM6556	Clock input
70	XT2O		N. C	
71	XT1I	I	MSM6556	Clock input
72	XT1O		N. C	
73	VCC5		VDD	Power source for oscillation
74	GND4		GND	
75	DRMP	I	MSM6557	Drum pulse input
76	AZM	O		Azimuth signal output
77	SH1	O		ATF sample-hold pulse 1 (Before track)
78	SH2	O		ATF sample-hold pulse 2 (After track)
79	SH3	O		ATF sample-hold pulse 3 (Self track)
80	CLK9	O		Clock output for MSM6557 (9. 408MHz)
81	CMD	I		Serial data command timing signal input
82	SO	O		Serial data output
83	SI	I		Serial data input
84	SCK	I	uPD75316	Timing clock for serial data
85	RESET	I	RESET circuit	Reset signal input (L:Active)
86	MINTB	O	μPD75316	Timing signal for serial data transmitting/receiving
87	VCO2O	O		VCO2 clock output terminal
88	ADIN	I	CS5349	Serial data input from A/D converter
89	DAOUT	O	PCM68	Serial data output to A/D converter
90	1SFS		N. C	
91	032FS	O	D/A, A/D	32*FS output

(MSM6556)

Pin No.	Terminal name	Type	Connected to	Function
92	OFS	O	D/A, A/D	FS(sampling frequency) output
93	02FS		N.C	
94	PMUTE	O	Mute circuit	Forced exterior mute signal output
95	BCK		GND	
96	EXIN			
97	EXFS			
98	SYNC			
99	TEST			
100	VDD3		VDD	

5-3. MSM6557 (Servo LSI)

Pin No.	Terminal name	Type	Connected to	Function
1	VDD3		VDD	Power source for logic circuit
2	CLK	I	MSM6556	Master clock input(9.408MHz)
3	OFS	I	VDD	
4	SH3	I	MSM6556	ATF sample-hold pulse 3(self track)
5	SH2	I		ATF sample-hold pulse 2(back track)
6	SH1	I		ATF sample-hold pulse 1(before track)
7	AZM	I		Azimuth signal input(Drum reference signal)
8	DRMP	O		Drum pulse output(H:A-head, L:B-head)
9	TP0		VDD	
10	TP1		GND	
11	RLP0		VDD	
12	RLP1		GND	
13	DRMSL0	I	VDD	Radius of drum creation terminal
14	DRMSL1	I	GND	(00:30, 01:20, 10:15)
15	RVS	I	GND	Error voltage polarity creation terminal
16	PO12	O	MSM6556	Panic-Mute cancellation output
17	PO13	O	CS5349	Power-Down signal output
18	PO14	O		Control signal for center latch of PLL3(Play:H)
19	PO15		N.C	
20	PGI	I	PGO	PG input for drum servo
21	PGO	O	PGI	Drum PG amplifier
22	N.C		N.C	
23	ER2	O	TC4W53F	Error voltage for capstan(When Rec/Play mode)
24	ER3	O		ATF error voltage(When Play mode)
25	DPO	O	TA8174	Drum pulse output
26	AGND1		GND	For analog circuit
27	DP0	I		Drum PG AMP+ input terminal
28	DP1	I		Drum PG AMP- input terminal
29	N0	O		Drum PG AMP output terminal
30	RLT1	I		Take-up reel FG AMP- input terminal
31	RLT0	I		Take-up reel FG AMP+ input terminal
32	VCC		VDD	Power source for analog circuit
33	RLS1	I		Supply reel FG AMP- input terminal
34	RLS0	I		Supply reel FG AMP+ input terminal
35	CFG	I		Capstan FG input terminal

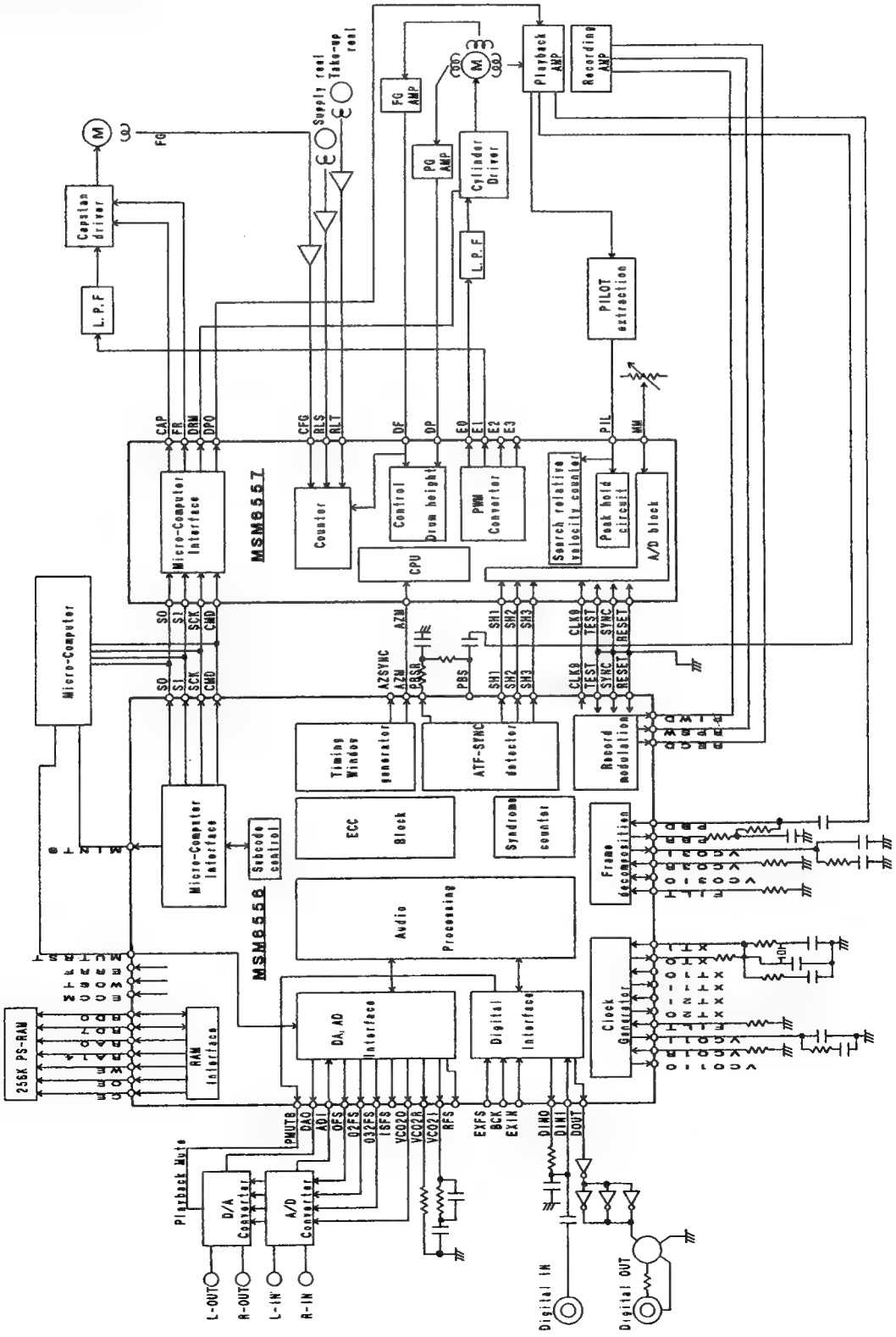
(MSM6557)

Pin No.	Terminal name	Type	Connected to	Function
36	DF	I		Drum FG input terminal
37	VDD1		VDD	For digital circuit
38	DRM	O	TDA5140AT	Controls ON/OFF for drum motor (L:OFF, H:ON)
39	ER0	O		Drum turning control signal output (PWM)
40	ER1	O	TC4W53F	Capstan turning control signal output (PWM)
41	FR	O	LB1851M	Capstan FW/RW change-over signal (L:FW, H:RW)
42	CAP	O	LB1851M	Capstan motor control signal (L:OFF, H:ON)
43	PO11	O	TA8174	Change-over signal for after-recording/playback (H:after-recording)
44	PO10 name	O		Change-over signal for solenoid brake ON/OFF (100ms H:ON)
45	PO9	O	BA6208F	Control for loading motor
46	PO8	O		Control for loading motor
47	VDD2		VDD	Power source for digital circuit
48	PI07	I		
49	PI06	I		REC protection SW input terminal (Protection hole is closed:L)
50	PI05	I	Hole sensor	Prerecorded commercial tape detecting terminal (Playing prerecorded commercial tape : L)
51	PI04	I	Hole sensor	Tape existence detecting terminal
52	IOCU		GND	Change-over terminal for input/output of PI04~7
53	PI03	I		Cassette holder SW input terminal (When DAT-tape is set:L)
54	PI02	I		Loading motor sensing pattern input terminal (MS2)
55	PI01	I		Loading motor sensing pattern input terminal (MS1)
56	PI00	I		Loading motor sensing pattern input terminal (MS0)
57	IOCL	I		Change-over terminal for input/output of PI03~0
58	GND2		GND	For digital circuit
59	AGND3			For analog circuit
60	PIL	I	TA8174	PILOT signal input terminal
61	ED0	O		Connected to condenser for PILOT peak hold
62	ED1	I		Comparison reference voltage for PILOT signal
63	AD3	I		Voltage input terminal from DEW sensor
64	VCC3		VDD	Power source for analog circuit
65	VCC2			Power source for analog circuit
66	AD2	I		+2.5V input
67	AD1	I	Remote control	Control voltage input from remote-control
68	AD0	I		Voltage adjustment terminal for drum height (phase)
69	AGND2		GND	For analog circuit
70	GND1			For digital circuit
71	GND3			For digital circuit
72	FGO	O	μPD75316 (CPU)	Capstan FG output
73	RLTU	O		Take-up reel FG output
74	RLSP	O		Supply reel FG output
75	RESET	I	Reset circuit	Reset input terminal
76	SCK	I	μPD75316 (CPU)	Serial data timing clock input
77	SI	I		Serial data input
78	SO	O		Serial data output

(MSM6557)

Pin No.	Terminal name	Type	Connected to	Function
79	CMD	I		Serial data command timing signal input
80	SYNC	I	GND	

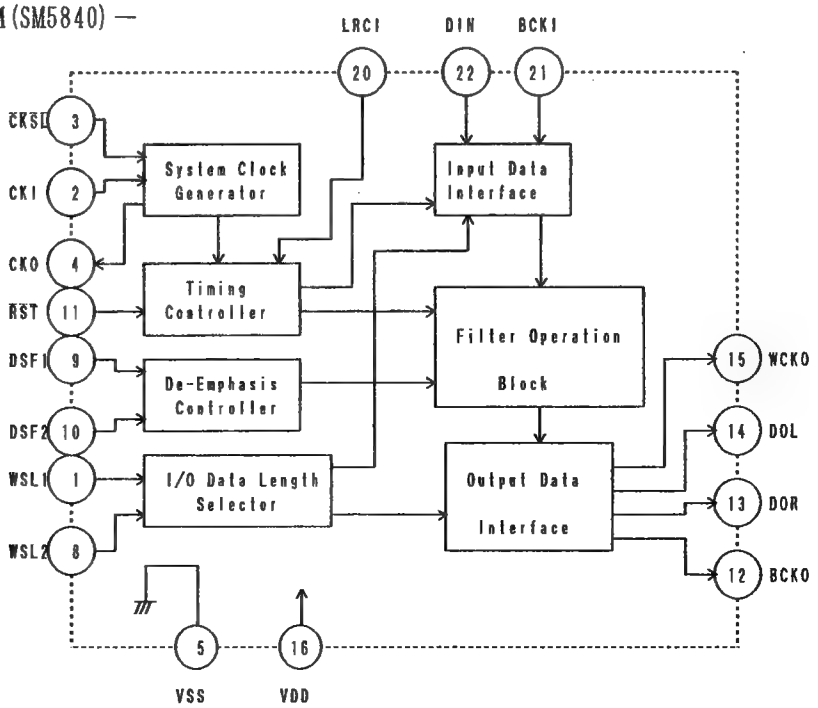
MSM6556/MSM6557 BLOCK DIAGRAM



5-4. SM5840 (Digital Filter)

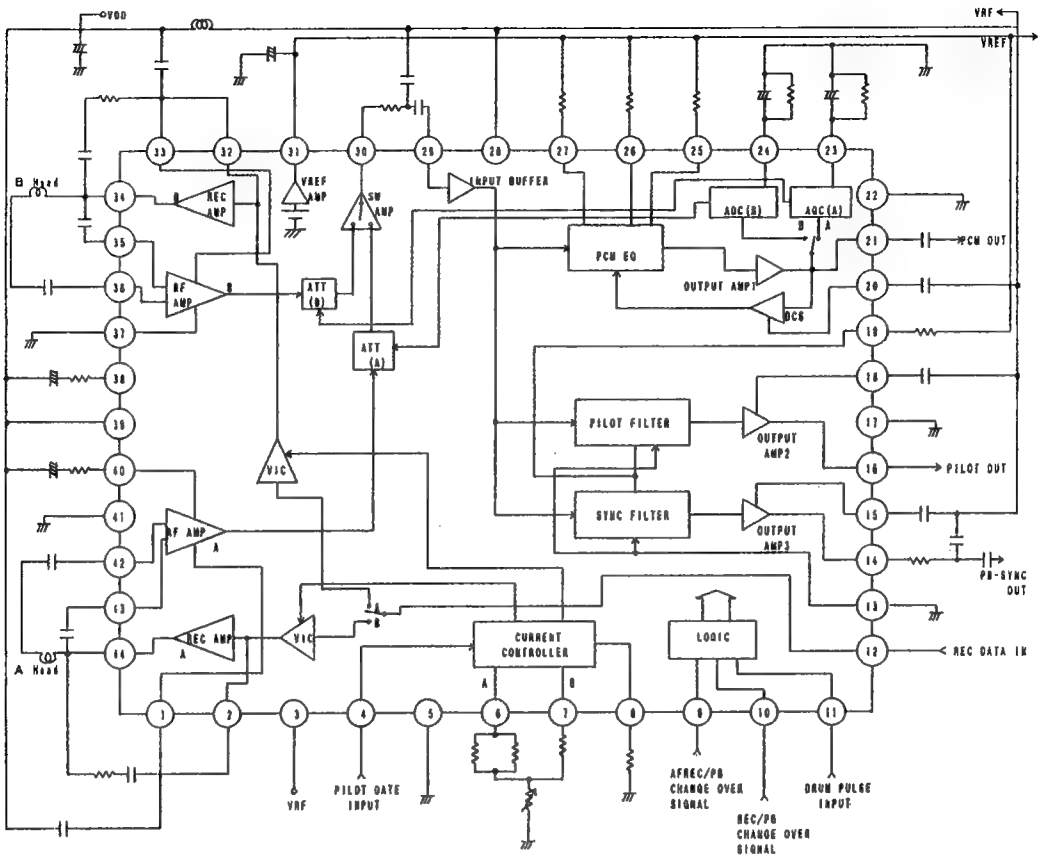
<table>
<tr><th>Pin No.</th><th>Terminal name</th><th>Type</th><th>Connected to</th><th>Function</th></tr>
<tr><td>1</td><td>WSL1</td><td>I</td><td>DGND</td><td>Input/output data bit length selection terminal</td></tr>
<tr><td>2</td><td>CKI</td><td>I</td><td>MSM6556</td><td>System clock input</td></tr>
<tr><td>3</td><td>CKSL</td><td>I</td><td>DGND</td><td>System clock selection terminal (256fs)</td></tr>
<tr><td>4</td><td>CKO</td><td>O</td><td>PCM68U</td><td>System clock output</td></tr>
<tr><td>5</td><td>VSS</td><td></td><td>DGND</td><td></td></tr>
<tr><td>6, 7</td><td></td><td></td><td>N.C</td><td></td></tr>
<tr><td>8</td><td>WSL2</td><td>I</td><td>VDD</td><td>Input/output data bit length selection terminal (Selecting at pin 1 and pin 8)
<table>
<tr><th>WSL1</th><th>WSL2</th><th>Input bit length</th><th>Output bit length</th></tr>
<tr><td>H</td><td>L</td><td>16 bit</td><td>18 bit</td></tr>
</table></td></tr>
<tr><td>9</td><td>DSF1</td><td>I</td><td>μPD75316 (CPU)</td><td>De-emphasis selection terminal 1</td></tr>
<tr><td>10</td><td>DSF2</td><td>I</td><td>μPD75316 (CPU)</td><td>De-emphasis selection terminal 2
<table>
<tr><th colspan="2">Terminal</th><th colspan="2">De-emphasis</th></tr>
<tr><th>DSF1</th><th>DSF2</th><th>ON/OFF</th><th>fs</th></tr>
<tr><td>L</td><td>L</td><td>ON</td><td>44.1KHz</td></tr>
<tr><td>L</td><td>H</td><td>ON</td><td>48.0KHz</td></tr>
<tr><td>H</td><td>H</td><td>ON</td><td>32.1KHz</td></tr>
<tr><td>H</td><td>L</td><td>OFF</td><td></td></tr>
</table></td></tr>
<tr><td>11</td><td>RST</td><td>I</td><td>Power supply</td><td>Reset signal input (L:Active)</td></tr>
<tr><td>12</td><td>BCKO</td><td>O</td><td rowspan="4">PCM68U</td><td>Bit clock output</td></tr>
<tr><td>13</td><td>DOR</td><td>O</td><td>Data output (R-ch 8*fs)</td></tr>
<tr><td>14</td><td>DOL</td><td>O</td><td>Data output (L-ch 8*fs)</td></tr>
<tr><td>15</td><td>WCKO</td><td>O</td><td>Word clock output</td></tr>
<tr><td>16</td><td>VDD</td><td></td><td>VDD</td><td></td></tr>
<tr><td>17~19</td><td></td><td></td><td>N.C</td><td></td></tr>
<tr><td>20</td><td>LRCI</td><td>I</td><td rowspan="3">MSM6556</td><td>Sample rate (fs) clock for input data</td></tr>
<tr><td>21</td><td>BCKI</td><td>I</td><td>Bit clock input</td></tr>
<tr><td>22</td><td>DIN</td><td>I</td><td>Data input terminal</td></tr>
</table>

—BLOCK DIAGRAM (SM5840) —

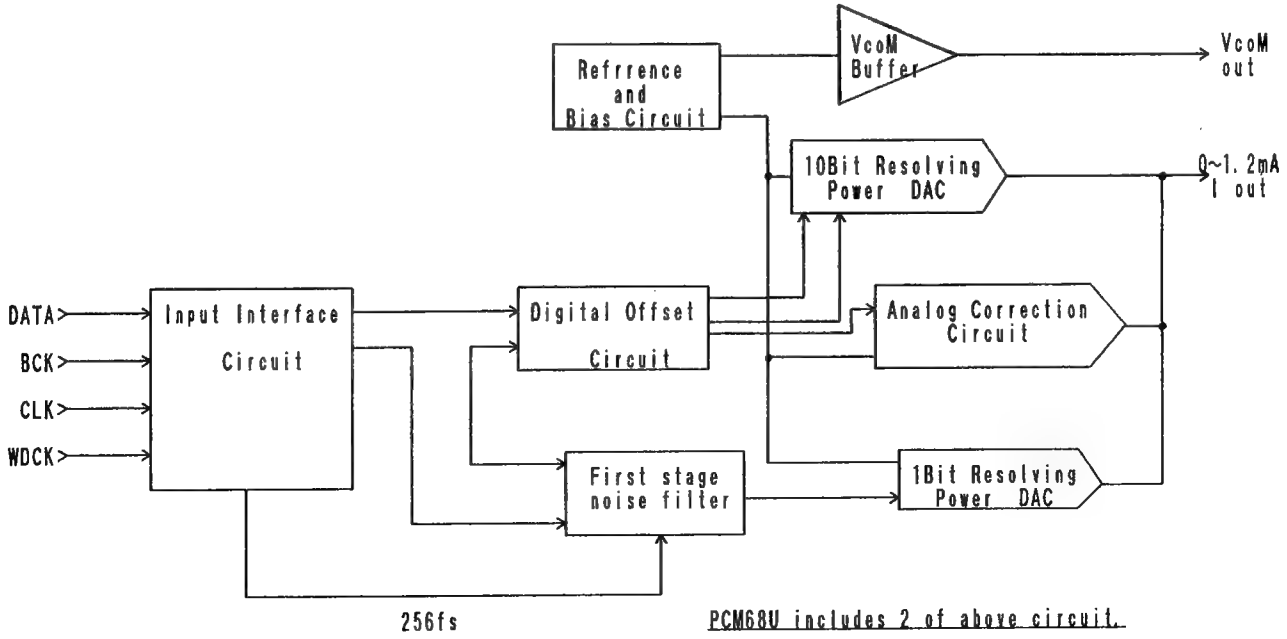


6. IC BLOCK DIAGRAM

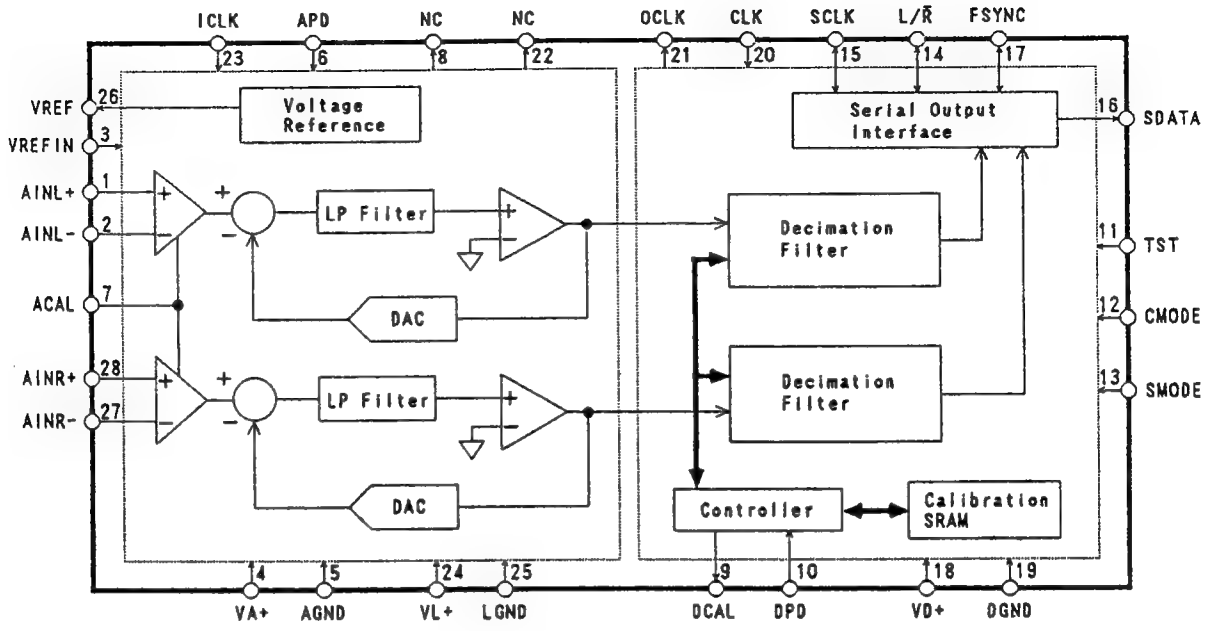
6-1. TA8174F (RP-AMP)



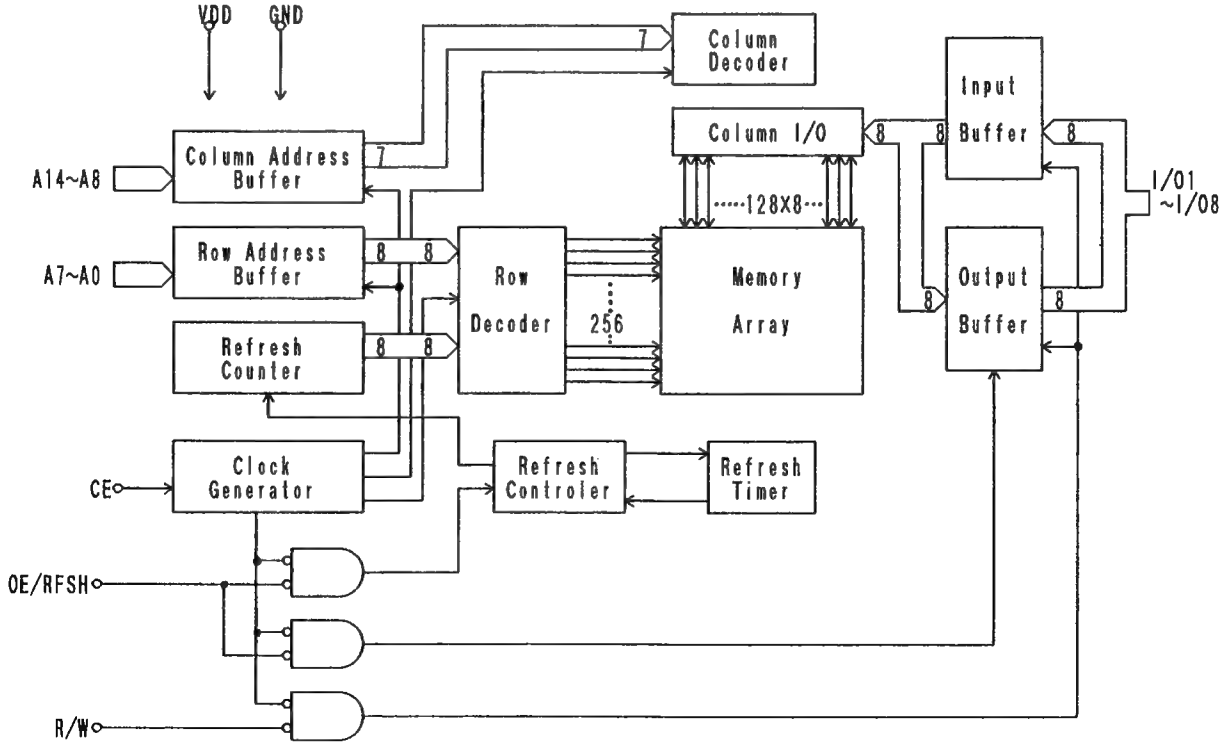
6-2. PCM68U (D/A converter)



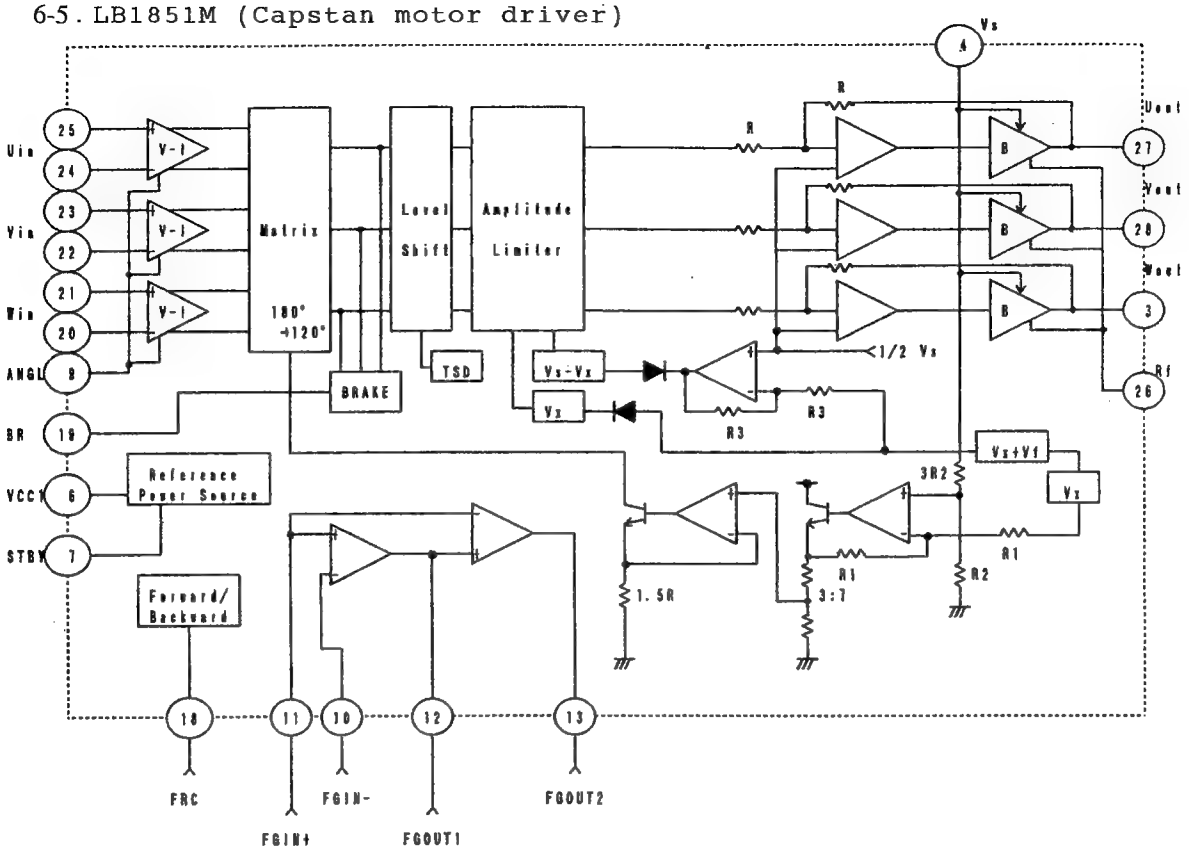
6-3. CS5349 (A/D converter)



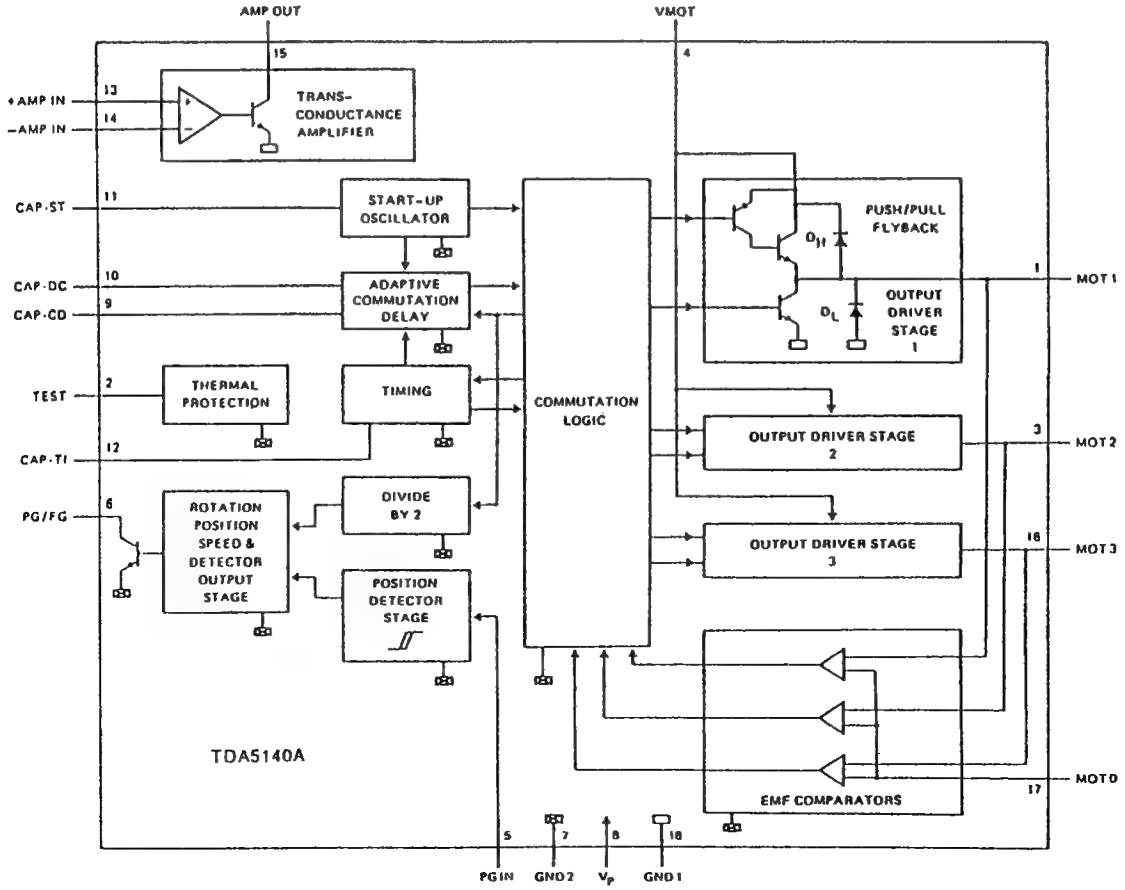
6-4. TC51832FL-10 (PS-RAM)



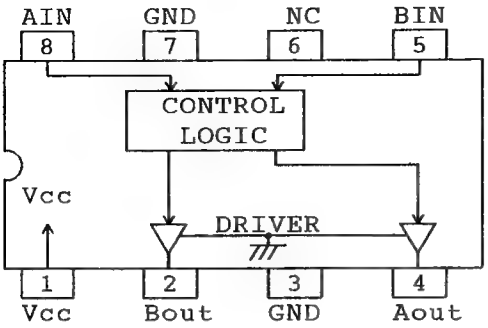
6-5. LB1851M (Capstan motor driver)



6-6. TDA5140AT (Cylinder motor driver)

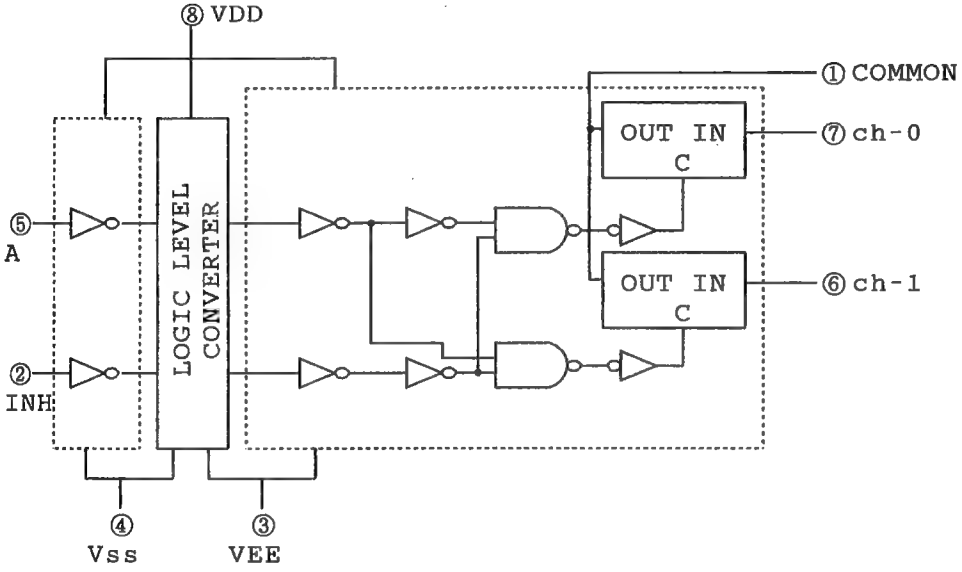


6-7. BA6208F(Loading motor driver)



AIN	BIN	AOUT	BOUT
H	H	L	L
H	L	H	L
L	H	L	H
L	L	OPEN	OPEN

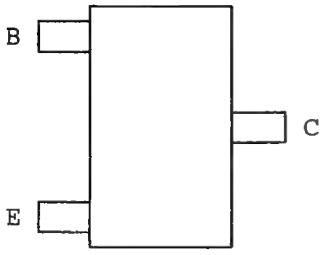
6-8. TC4W53F(2-Channel multiplexer)



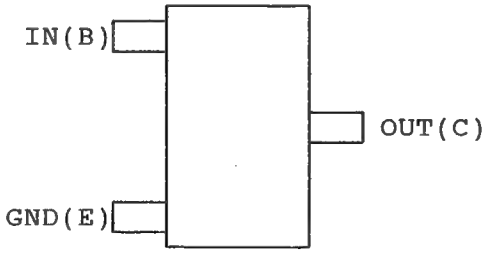
CONTROL INPUT		ON CHANNEL
INH	A	
L	L	ch-0
L	H	ch-1
H	※	NOTE

※:Don't care

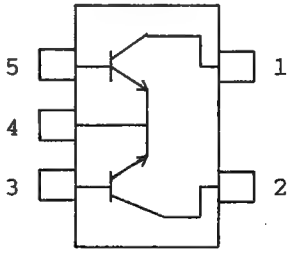
6-9. 3-terminals chip transister



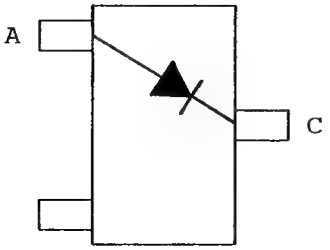
6-10. 3-terminals chip digital transister (DTA~, DTC~)



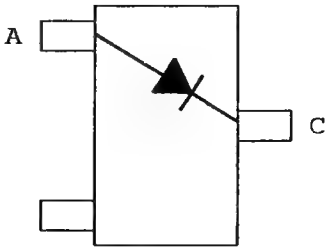
6-11. 5-terminals chip transister (FMW1)



6-12. Chip zener diode(02CZ6.2Y)



8-13. Chip diode(DSH015-TL)



7. CIRCUITRY OUTLINE

This unit is ultra-small sized DAT which employs newly developed LSI and new-type small-sized mechanism.

(1) DAT mechanism

This unit employs DAT mechanism mounted with small-sized cylinders of 30f ~ 20f diameters which are formerly used.
This unit comprises three kinds of motors, i, e, cylinder motor, capstan motor, and loading motor, as well as one solenoid.
Cylinder motor is under sensor-less system.

(2) Electric circuits

1 Recording

Signal input from analog IN is converted to digital signal by 1 bit A/D controller with 64 times over-sampling.
After then, the signal is input to signal processing LSI (MSM6556) where after adding error correcting symbols and sub-codes, and data modulation is made in order to write in tape, then amplified by preamp (TA8174) to send to the rotary head.

2 Playback

Signal read from the rotary head is demodulated to digital signal by signal processing LSI (MSM6556) after amplified by preamp (TA 8174).
After that, converted to analog signal by 18 bit D/A converter (PCM68U) after removing noises by digital filter (SM5840) and is output to line through buffer amplifier and low-pass filter.

3 Servo mechanism

Control on revolution number of drum :

Signal from PG/FG sensor in cylinder motor is amplified and is input to Servo LSI (MAM6557) and outputs speed control and rotation ON/OFF control signal.
Thus, it rotates 3-phased cylinder motor via cylinder motor driver (TDA5140AT).

Control on tape travel speed :

Signal from FG sensor in capstan motor is sent to Servo LSI (MAS6557) via FG amplifier in capstan motor driver (LB1851M), and outputs those three signals for rotation control, rotation ON/OFF and rotating direction control.
Thus, it rotates 3-phased capstan motor by capstan motor driver. (LB1851M).

4 Mechanism detection device

Detection signal is output from "LM sensing pattern" to detect loading status, and sent to Servo LSI (MSM6557).
Loading motor which shifts tape travel outputs control signal and send this to rotate motor via loading motor driver (BA6208F).
When shifted from Fast Forward, Rewind modes to STOP mode, control on latching solenoid brake for mechanical braking, status detection of cassette hole, and signal from reel center, etc. will be controlled by CPU (mPD75316) via Servo LSI (MSM6557).

5 CPU

Performs detection of operator keys and LCD indicator controls on signal processing LSI (MAM6556) and Servo LSI (MSM6557).

6 Power supply

AC adapter (9V) or battery (6V) is used as the primary power, and they acts with positive power source.
Furthermore, due to realization of use of wide-ranged low-power, approximate 7.5 hour continuous playback is possible, when Ni-Cd battery (6V 1.1A/h) is used.

8. CPU INTERFACE

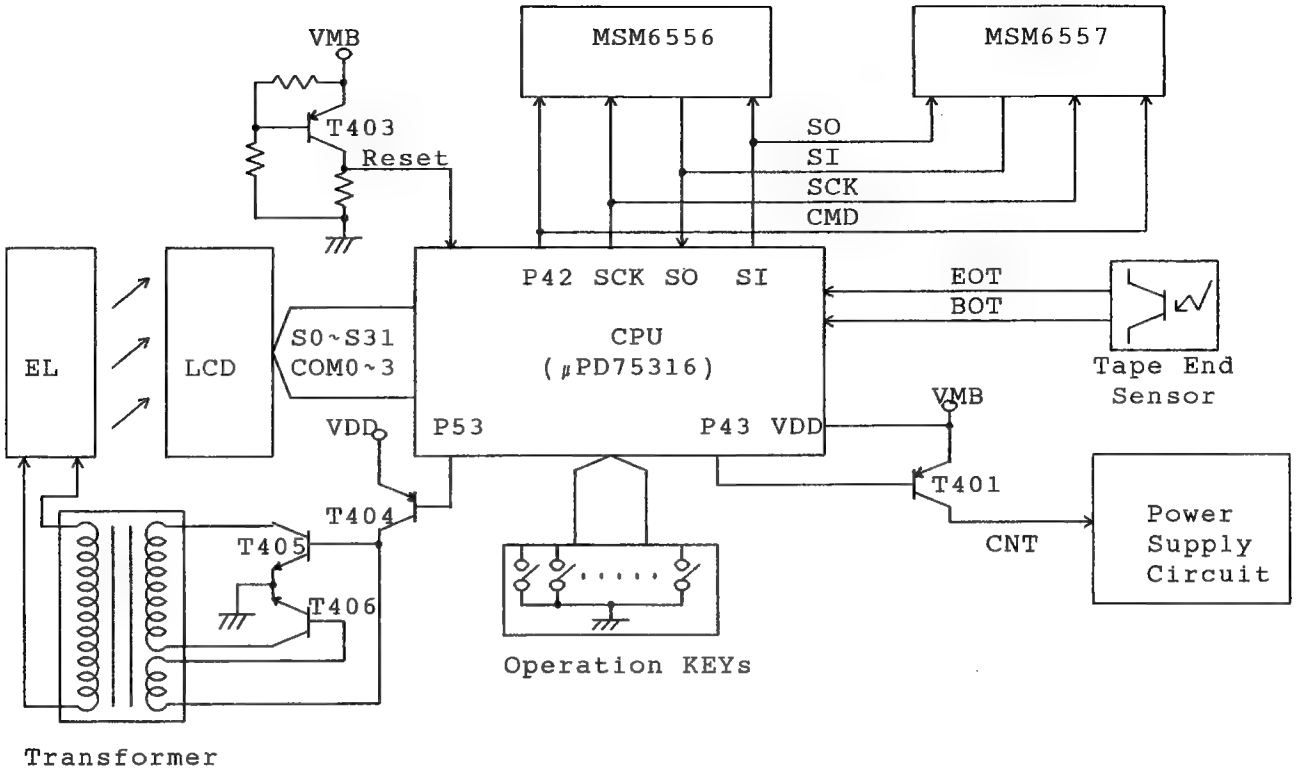


Fig. 1

- This is 8-bit CPU having an integral 16K-Byte ROM.
- Power source for CPU uses "VMB" which constantly outputs voltage even the power is off.
- CPU controls MSM6556 and MSM6557 with 4 serial data.

  SO.....Serial data output.
  SI.....Serial data input.
  CMD.....Serial data command timing signal.
  SCK.....Serial data timing clock output.
- The LCD is driven with 32 segments(S0~S31) and 4 commons(COM0~COM3).
- The LCD unit has an EL(electro luminescence) and when terminal P53 of CPU is "L" ,T4 turns on and the EL lights up.
- As T405 and T406 oscillates, this circuit generates 1 kHz alternating current and transformer generates about 90V-RMS(alternating current).
- Tape End Sensor is mounted not to cut the DAT tape.
  When Tape End Sensor detects the end or the beginning of tape at FF/REW modes, Main Brake (L) or (R) brakes the Capstan Motor.
- When turning the power switch on, terminal P43 of CPU shifts from "H" to "L" and T401 turns on.
  Therefore ,CNT signal shifts from "L" to "H", it enables the power supply circuit to work.
- When turning the power switch is off or APO(Auto-Power-Off) function works, terminal P43 of CPU shifts from "H" to "L" and shuts the power supply circuit off.

9. SERVO SYSTEM

Servo system of DAT has Drum Servo, Capstan Servo and Reel Servo.
Each servo system controls motor velocity.
The magnetic material on the shaft of the motor and the magnetic sensor generates pulse voltage gained from motor rotation.
Counter converts pulse length to digital value and detects whether its digital value is higher or lower than reference voltage.
And servo system controls supply voltage for motor.
Supply voltage is controlled by PWM(Pulse Width Moduration).

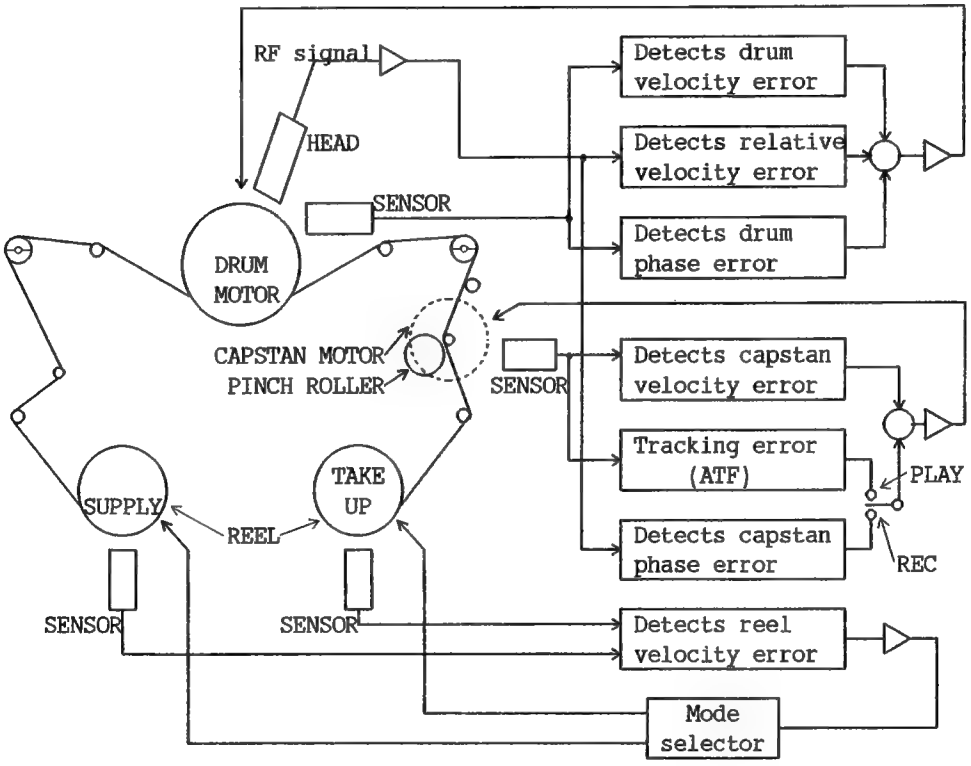


Fig. 2 SERVO SYSTEM BLOCK DIAGRAM

9-1. Drum Servo
Controls correct drum turning by using velocity servo and phase servo.

9-2. Capstan Servo
Controls supply side velocity of the tape.

9-3. Reel Servo.
Controls the tape to constant tension.

10. DRUM SERVO

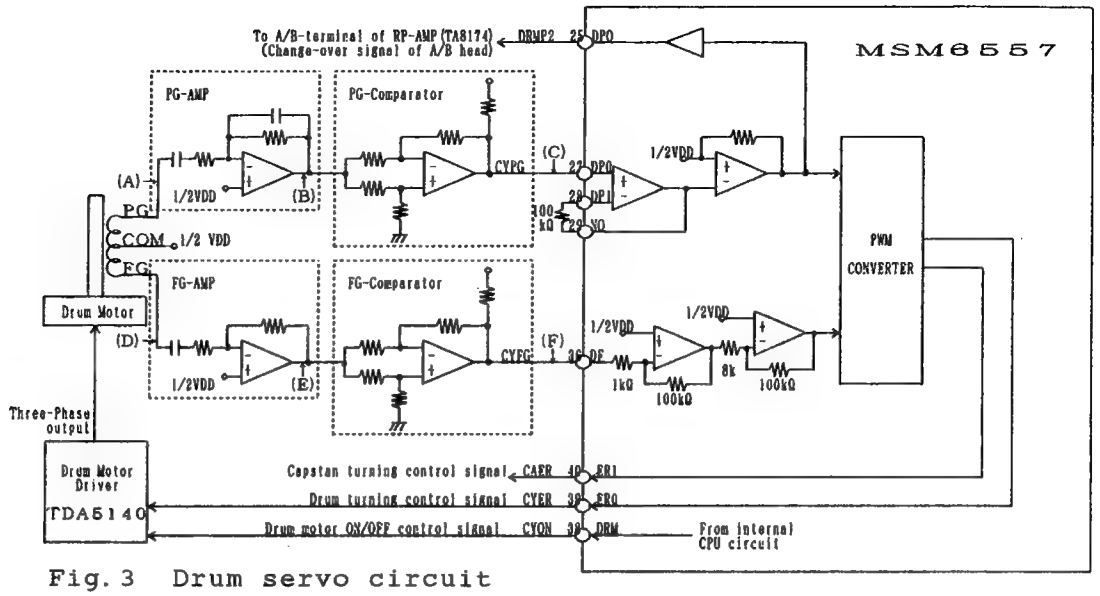


Fig. 3 Drum servo circuit

・Pattern coils of Drum motor detects magnetic variation by turning motor. Pattern coils have FG-Coil for velocity detect and PG-Coil for phase detect.

《Circuit explanations》

1. When "Drum motor ON/OFF control signal"(CYON) shifts to "H", Drum motor driver(TDA5140) turns on and actuates Drum motor.
2. PG signal.
   PG-Coil generates PG-signal(Fig. 4-(A)) by turning Drum motor and PG-AMP converts to PG-AMP output signal, as shown in Fig. 4-(B)
   Further, PG-Comparator converts PG-AMP output signal(Fig. 4-(B)) to pulse wave form, as shown in Fig. 4-(C) and it is input to terminal DPO of servo LSI(MSM6557) as reference phase signal.
   After amplifying PG-Comparator output signal(CYPG) by LSI(MSM6557), one amplified signal is input to PWM-CONVERTER in MSM6557 and the other is output from DPO terminal as change-over signal for A and B head.
3. FG signal.
   After FG-AMP amplifies FG-Coil output signal, FG-Comparator converts the amplified signal to pulse wave form of duty-50%, as shown in Fig-.5-(F).
   After amplifying FG-Comparator output signal(CYFG) by LSI(MSM6557), PWM-CONVERTER(F-V convert) converts the amplified signal from frequency to voltage whict is output from terminal CYER(Pin 40) of MSM6557. CYER signal is input to TA5140 and three-phase output of TDA5140 keeps the velocity of the motor constant.

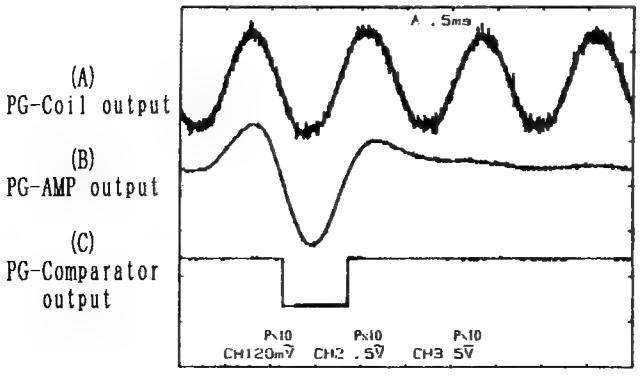


Fig. 4 PG signal

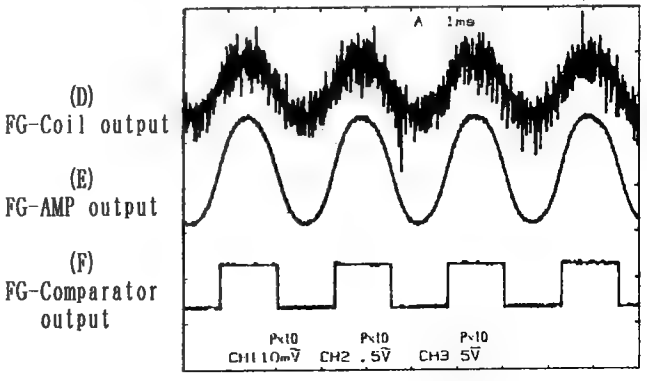


Fig. 5 FG signal

11. CAPSTAN SERVO

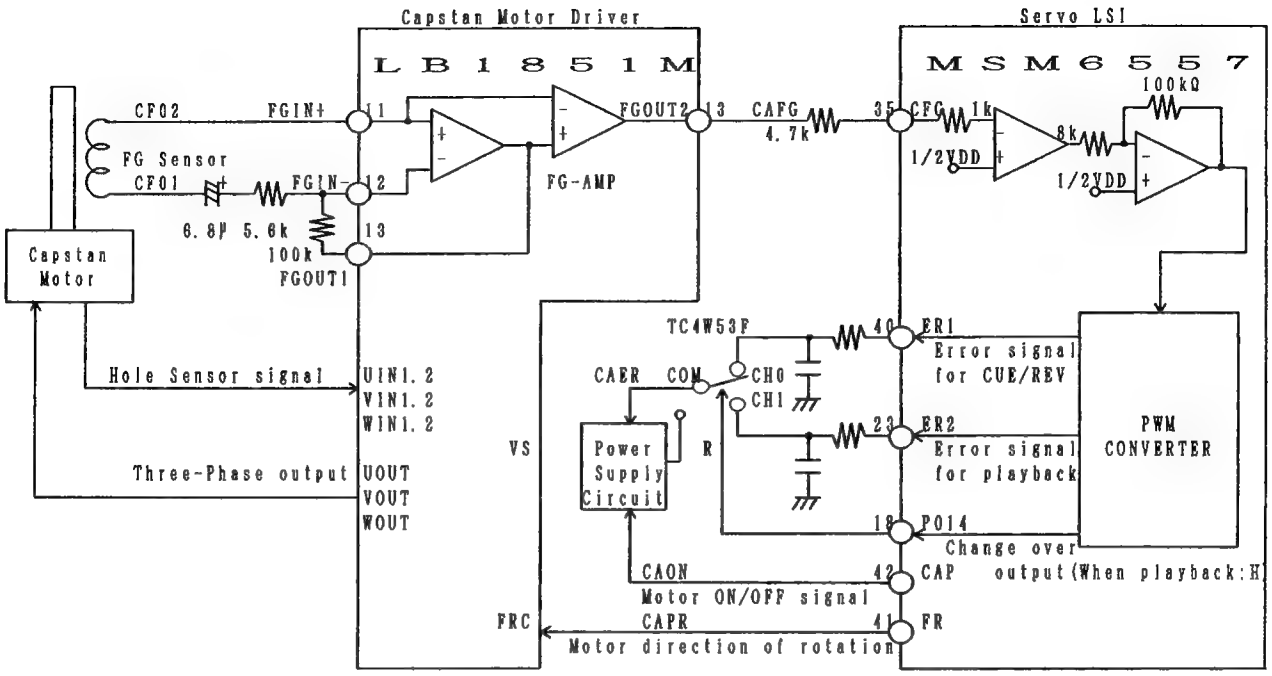


Fig. 6 Capstan Servo Circuit

Capstan motor has only FG-Sensor for detecting velocity.

《Circuit explanations》

1. When "CAON" signal shifts to "H", the Capstan motor turns.
   (When "CAPR" signal is "L":Forward direction
   When "CAPR" signal is "H":rewind direction)
2. The Capstan motor has an internal Three-Phase Hole Sensor.
   These Hole Sensors detect direction of rotation and position of the Capstan motor.
3. FG-Sensor generates "CF01" and "CF02" signals by turning the Capstan motor and an internal FG-AMP of LB1851M amplifies these signals.
   Amplified signal(CAFG) is output to servo LSI(MSM6557).
   Servo LSI(MSM6557) converts "CAFG" signal from frequency to voltage at PWM circuit in servo LSI(MSM6557). After converted signals(ER1 and ER2) pass through the integrating circuits, these signals go to TC4W53F (Multiplexer).
4. When playing at the "PLAY" mode, TC4W53F selects CH1 since terminal PO14 of LSI(MSM6557) shifts to "H".
   And when playing at the "CUE/REV" mode, TC4W53F selects CH0 since terminal PO14 shifts to "L".
5. Output signal from TC4W53F(CAER) passes through the Power Supply Circuit and go to LB1851M.
   Three-Phase outputs(UOUT, VOUT, WOUT) from LB1851 controls motor velocity.

12. REEL SERVO

Reel rotates by using rotation of capstan motor and controls quantity of turns by using the Capstan servo.

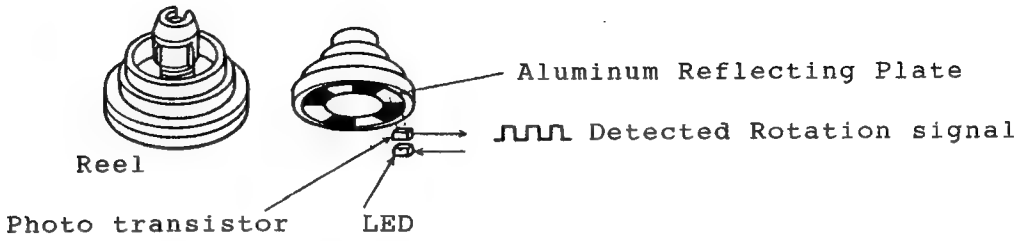


Fig. 7 Reel Mechanism

13. EOT AND BOT DETECTING MECHANISM

- When DA-R100 plays at "REW" or "FF" mode, Main Brake (L) and (R) prevent the tape from cutting by detecting the beginning or the end of tape.
- DAT tape has transparent portion in the beginning and the end of tape, as shown in Fig. 8.
- When magnetic tape section is played, it reflects light of LED and the photo transistor detects light of LED.
- However, when transparent tape section runs, it doesn't refrects light of LED. Therefore, running tape stops by turning on the photo transistor.

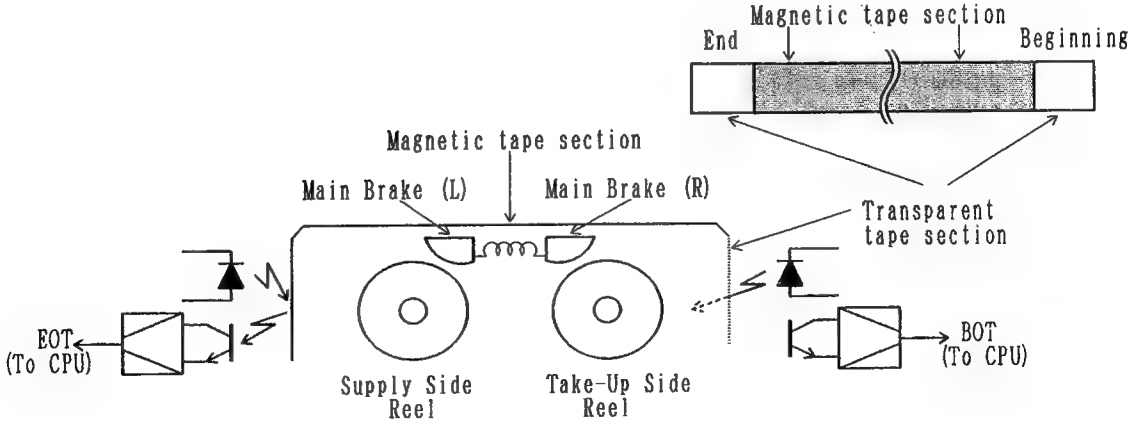


Fig. 8 EOT and BOT detecting Mechanism

14. AUDIO SIGNAL INPUT/OUTPUT

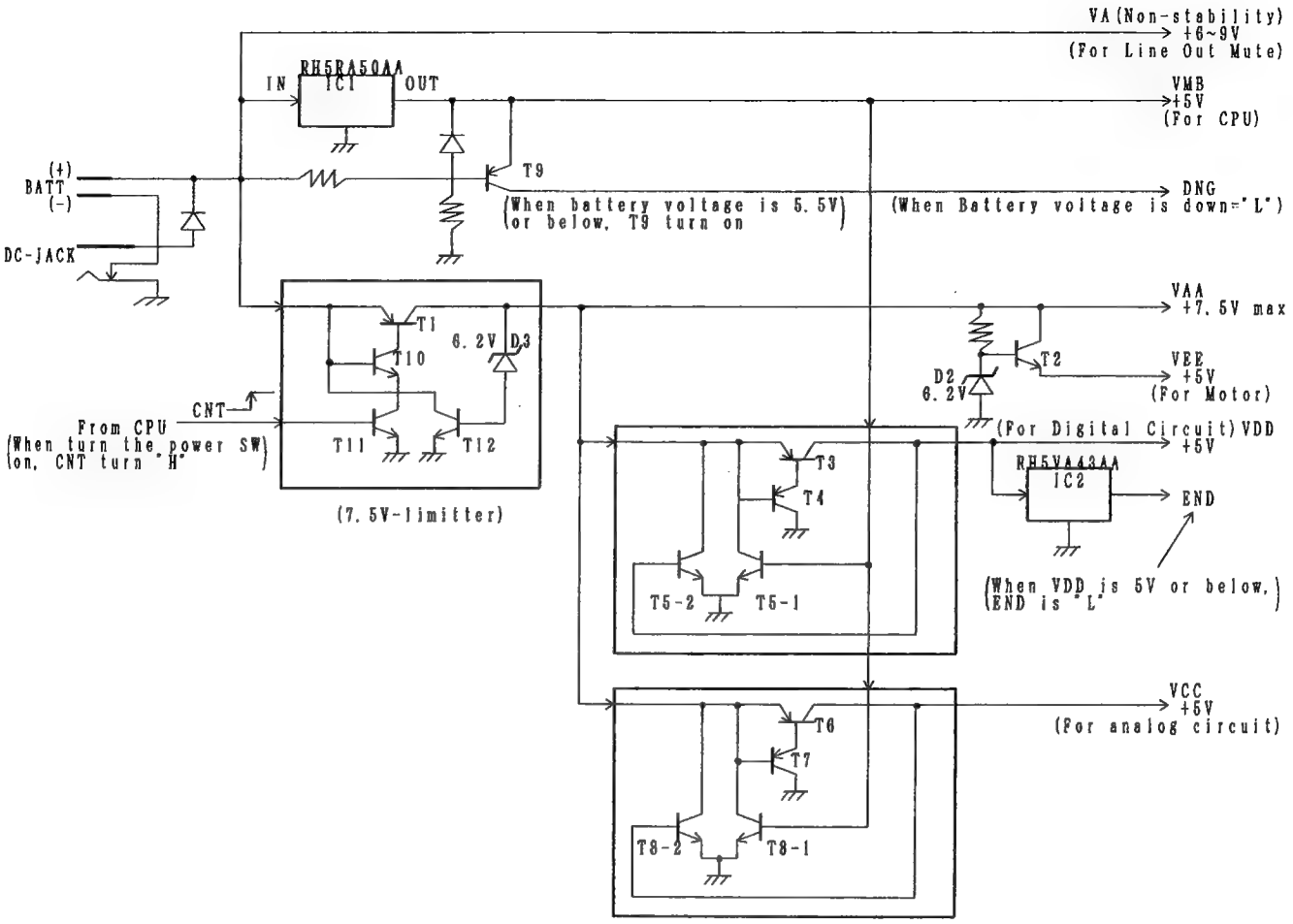


Fig. 9

《Circuit explanations》

- When a battery or an adapter is connected, "VAA" and "VMB" are output. These voltages(VAA & VMB) are unrelated to turn the power SW on and off, these voltages are usually output.
- When battery voltage is 5.5V or below, T9 turn on and "DNG" signal shifts "L" to "H".
- "DNG" signal is output to CPU and to consume the battery is displayed on the LCD.
- When turning the power SW on, "CNT" signal shifts from "L" level to "H" and "VAA" is output by turning on T11, T10 and T1.
- "7.5V-limitter" controls voltage of "VAA" to 7.5V or below.
- When "VAA" is output, T2 turns on and VEE is output.
  When "VAA" is output, "VDD(VCC)" is output by turning on T5-1(T8-1), T4(T7) and T3(T6).
  T5-2(T8-2) stabilizes output voltage(VDD) to 5V by controlling quantity of current.
- IC2(RH5VA43AA) checks voltage level of "VDD" and when "VDD" is 4.3V or below, "END" signal informs the CPU of empty battery by shifting from "H" to "L".
- When turn the power SW off, "CNT" signal from CPU shifts from "H" to "L" and cuts "VAA", "VEE", "VDD" and "VCC".
  In a same way, when APO(Auto Power Off) function works, "CNT" signal shifts from "H" to "L".

15. POWER SUPPLY CIRCUIT

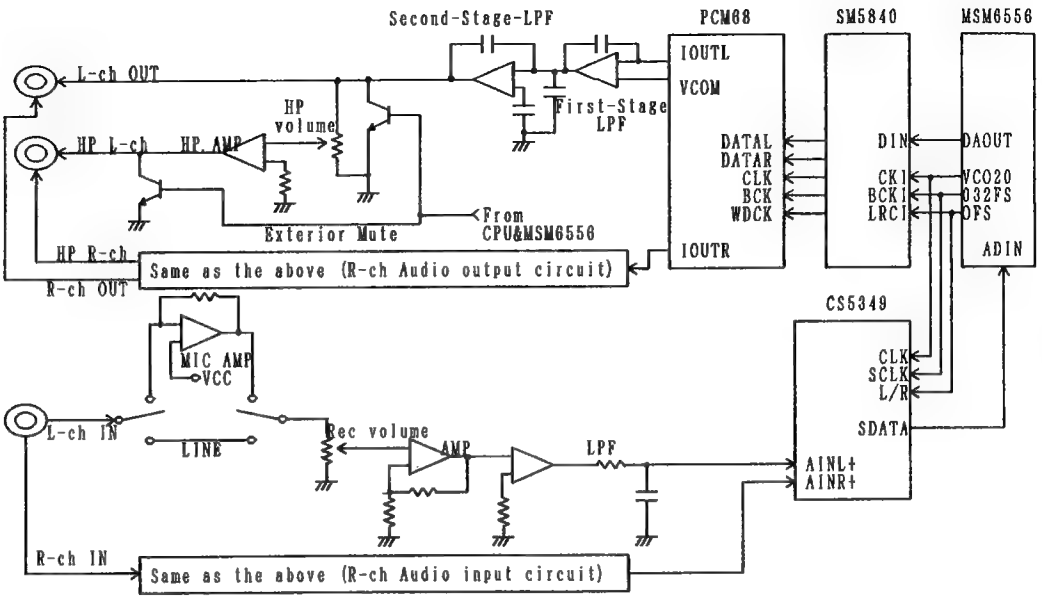


Fig.10 Audio signal input/output circuit

《Circuit explanations》

14-1. Audio Output

・Processing LSI(MSM6556) output serial data(DAOUT, VCO2O, 032FS, OFS) to Digital Filter(SM5840).

Serial data
- DAOUT・・・・・・・・Digital-Audio-Data.
- VCO2O・・・・・・・・System Clock.
- 032FS・・・・・・・・Bit Clock.
- OFS・・・・・・・・・・Sample Rate Clock.

・Digital-Audio-Data(DAOUT) synchronizes with "VCO2O", "032FS" and "OFS" signals. "DAOUT" goes to SM5840 which converts sampling frequency eight times. "DATAL" and "DATAR" signals go to D/A-Converter(PCM68U).
・"DATAL" and "DATAR" signals synchronize with "CLK","BCK" and "WDCK" signals. "DATAL" and "DATAR" signals are read to D/A-Converter. And D/A-Converter converts digital data to analog data.
"IOUTL" and "IOUTR" signals are output to First-Stage-LPF.
・"IOUTL" and "IOUTR" signals are current output. Therefore, First-Stage-LPF converts current to voltage. (I-V convert)
・Second-Stage-LPF cuts an image-noise of 364KHz or below.
And Analog-Audio-Data is output to LINE-OUT terminal and HP-OUT terminal.

14-2. Audio Input

・Analog-Audio-Data is input from LINE-IN terminal and REC-VOLUME controls recording level.
・After Analog-Audio-Data passes an AMP and LPF, it is output to A/D-Converter(CS5349).
・A/D-Converter converts Analog-Audio-Data from analog data to 16-bit digital data and its digital data(SDATA) is output to MSM6556.

16. ADJUSTMENT

Adjustment points and explanation

No	ITEM	Adjustment VR	Tools
1	Linearity adjustment	Mechanical	Oscilloscope, Test tape DAT-ER01 , Remoto Control for Test
2	Cylinder and clock pulse synchronism	VR601	Oscilloscope, Test tape DAT-PG01
3	REC level adjustment	VR301	Oscilloscope, Test tape DAT-ER01 , DAT-tape(non recorded tape)
4	Error rate check		Frequency counter Test tape DAT-ER01

16-1. TEST MODE

1)How to start the TEST MODE.

DTR-80P has the TEST MODE. To start the TEST MODE , the following steps must be followed.

1. Make the Test-Remoto-Control by adding a resistor(20KΩ ±1%) and a tact switch to remoto control circuit. (See Fig. 11)
2. Turn the power switch on.
3. Connect the Test-Remoto-Control to the head phone terminal.
4. Slide the "HOLD" switch and the "TIMER" switch of the Test-Remoto-Control to the "OFF" position.
5. Set the DAT tape.
6. Press the "TEST" button of the Test-Remoto-Control for a second.
7. Now DTR-80P starts the TEST MODE and "T-NTP" is displayed on the LCD.

The following three TEST MODE repeats whenever the "TEST" button of the Test-Remoto-Control is pressed at a time

T — NTP (Without tape check mode)
↓
T — LIN (Linearity adjustment mode)
↓
T — SID (Start-ID detecting check mode)

NOTE : To return normal MODE from the TEST MODE , turn the power switch off and on.

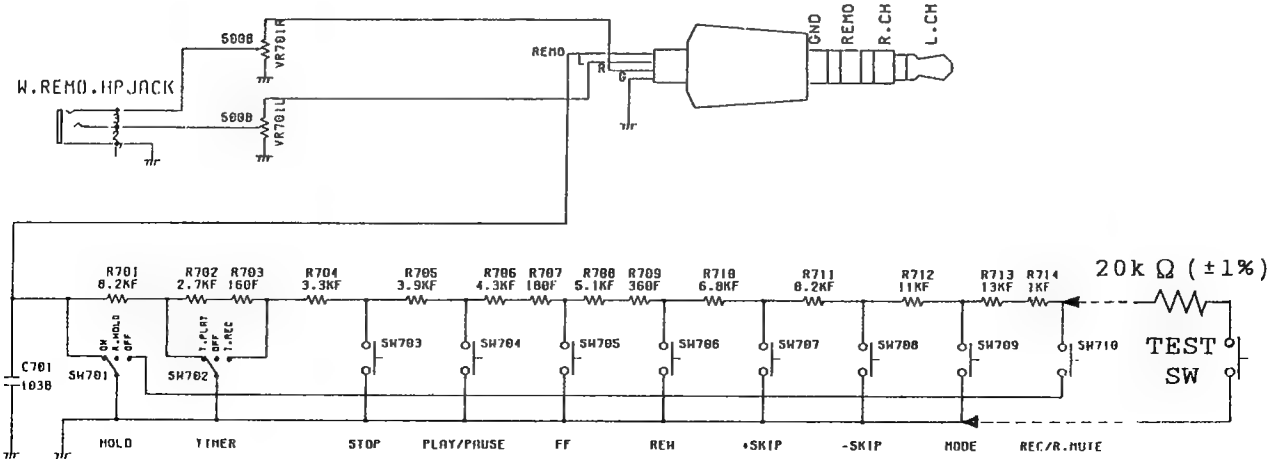


Fig. 11 Test-Remoto-Control circuit

2)Each TEST MODE function and explanations

1. T－NTP(Without tape check mode)
   T－NTP MODE is a TEST MODE that make the PLAY mode to actuate the mechanism without a DAT tape.
   Will be useful for the eye-check of the mechanism state.

2. T－LIN(Linearity adjustment mode)
   T－LIN MODE is a TEST MODE for Linearity adjustment. Will be useful for adjusting a envelope wave form at Linearity adjustment with using the test tape.

3. T－SID(Start ID detecting check mode)
   T－SID MODE is a TEST MODE that the transistor of Exterior-Mute turns on and cuts the LINE-OUT signal for 9 seconds of written Start-ID, when Start-ID in SUB-CODE area is detected.

16-2. Linearity adjustment.

[Check points]
External Trigger → Test pad DRMP2(MA2-PCB)
Oscilloscope CH1 → Test pad PBD(MA1-PCB)

[Procedure]
1. Connect the oscilloscope to the test pad.
2. Turn the power switch on.
3. Connect the Test-Remoto-Control to the head phone terminal.
4. Slide the "HOLD" switch and the "TIMER" switch of the Test-Remoto -Control to the "OFF" position
5. Press the "TEST" button of the Test-Remoto-Control for a second.
   (Now DTR-80P starts the TEST MODE and "T-NTP" is displayed on the LCD.)
6. Press the "TEST" button of the Test-Remoto-Control once.
   (Now DTR-80P starts the T-LIN of TEST MODE)
7. Set the test tape **DAT-ER01** and press the "PLAY" button.
8. Adjust the hight of the Supply Side Guide Roller(Post P2) and the Take-Up Side Guide Roller(Post P5) to make the envelope wave-form flat. (See Fig. 12 and Fig. 13)

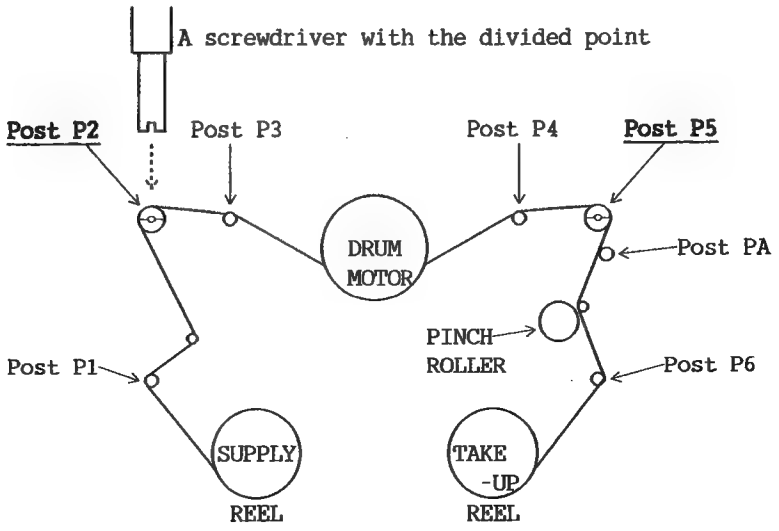


Fig. 12

Envelope wave-form is flat.

①The Supply side output level is low.
·Turn the Post P2 clockwise.

②The Take-Up side output level is low.
·Turn the Post P5 clockwise.

③The center output level is low.
·Turn the Post P2 and P5 counterclockwise.

④The Supply side and Take-Up side output level are low.
·Turn the Post P2 and P5 counterclockwise.

⑤Saw-tooth wave-form. (unstable)
·Turn the Post P2 and P5 clockwise.

Fig. 13 Envelope wave-forms

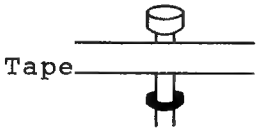
Make adjustment with the above ways normally. But if it does not help, try the following procedure.

A)Turn the Post P2 clockwise to quench the envelope wave-form.

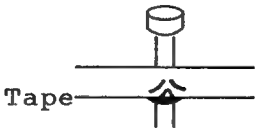
B)Turn the Post P2 counterclockwise to make the supply side envelope wave-form flat.

C)Turn the Post P5 clockwise or counter-clockwise to make the envelope wave-form flat.

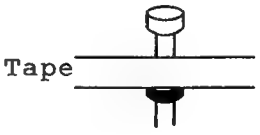
9. Check the tape contact surface of each guide flange is not float or curl.



NG
Tape is too high



NG
Tape is pushed, and too low



OK
Tape is rested on the lower level or a little bit over it.

Fig. 14

10. After adjustment of envelope is completed, eject the test tape from DTR-80P and play again.
When playing again, check the envelope wave-form is flat.
Repeat the above procedures two or three times.

11. When Linearity adjustment is completed, fix the post base fixing screw with bond.

NOTE : Apply bond to a round head of screw.

16-3. Cylinder and clock pulse synchronism adjustment.

This is the adjustment of cylinder phase by turning VR601 during play of test tape.

[Check points]
1. Oscilloscope CH1 → Test pad PBD(MA1-PCB)
2. Oscilloscope CH2 — Test pad PIWD(MA2-PCB)
3. Oscilloscope CH3 → Test pad DRMP2(MA2-PCB)·····Trigger

[Procedures]
1. Set the test tape **DAT-PG01** and press the "PLAY" button.**(T-LIN MODE)**
2. Adjust VR601 so that the rising edge of signal PIWD stops at the point where 130KHz Pilot signal start. (See Fig. 15 and 16)

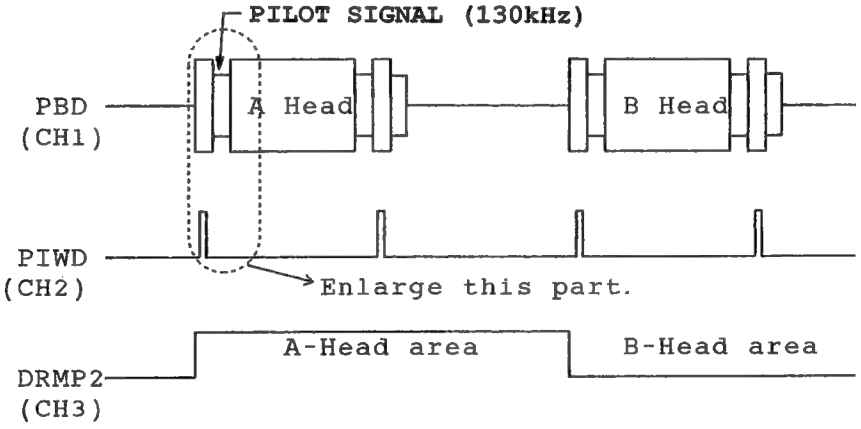


Fig. 15

3. Using "Delay" function of oscilloscope, enlarge the above dotted line area.

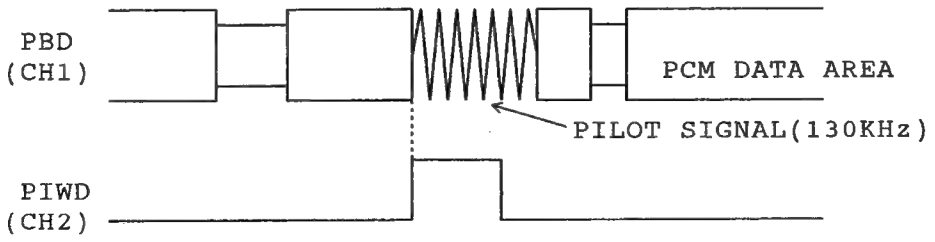


Fig. 16

NOTE : The waveform must be watched at the A-Head for this adjustment.
(The waveform picked up from A-Head is envelope data while DRMP2 signal is "H".)
If your oscilloscope have not "Delay" function, this adjustment is not possible.
You use oscilloscope without delay, make rough adjustment as shown in the Fig. 15.

16-4. REC level adjustment

NOTE : This adjustment is required only when you change the TA8174 (RP-AMP), and makes compatibility between other DAT tapes when recording and playing the tape by adjusting the recording level to the reference level.

[Check points]

Oscilloscope CH1 → Test pad PBD(MA1-PCB)
Oscilloscope CH2 → Test pad DRMP2(MA2-PCB)·····Trigger

[Procedures]

1. Connect pin 23 and pin 24 of TA8174 to GND.
2. Set the test tape and press the "PLAY" button.
3. Using "Delay" function of oscilloscope, enlarge ATF part. (See Fig. 17)

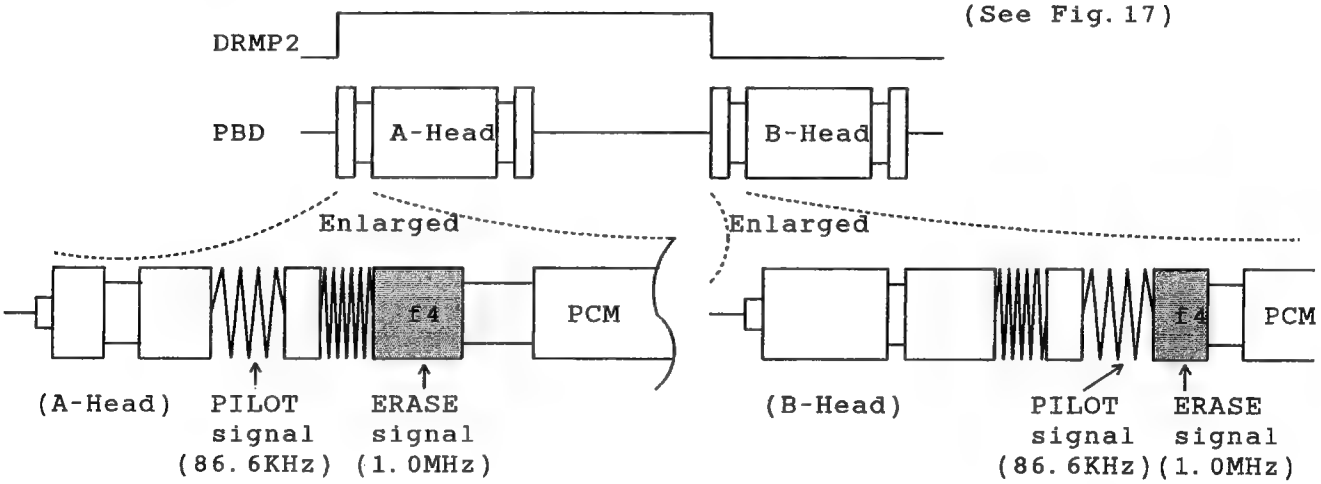


Fig. 17

4. Watch wave form of the aboves and measure the voltage levels f4 of A and B head.
5. Set the DAT-tape and record no sound for about 10 sec. (Be sure to use non recorded section of the tape.)
6. Playback the recorded no sound section of the DAT-tape and watch the voltage level f4.
7. Compare the voltage levels f4 between the **DAT-ER01** and recorded no sound section of the DAT-tape.
8. If voltage levels f4 between the test tape TY7551 and DAT-tape are different, turn VR301 and repeat the procedures as described in 4~7 till the voltage levels f4 between the two tapes become same level. (Adjust VR301 so that the voltage levels f4 between the TY7551 and DAT-tape become same level.)
9. After the adjustment, open pin 23 and pin 24 of TA8174.

16-5. Error rate check.

This check confirms that error count is regulated count while DAT tape is playing.

[Check point]

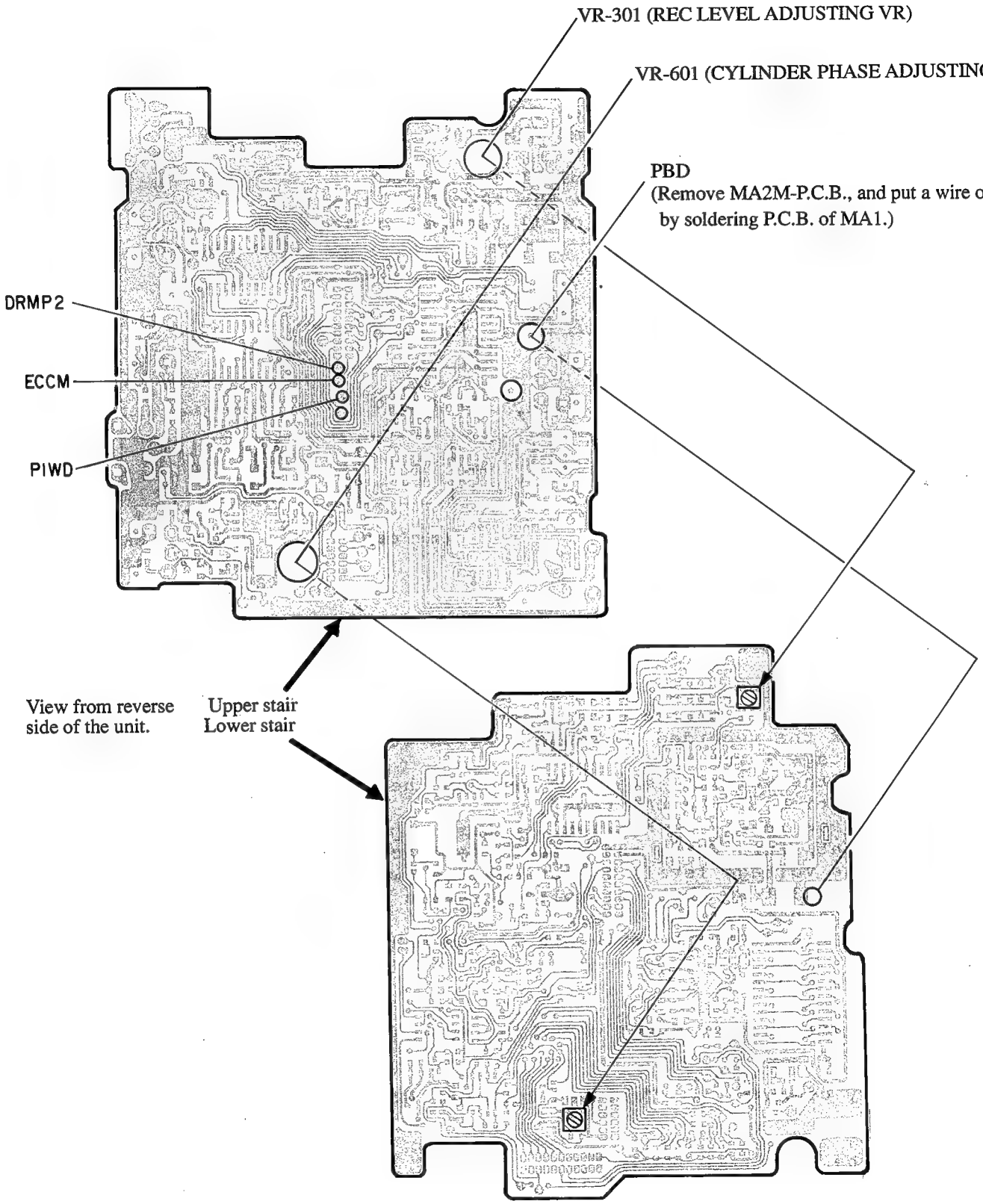
Frequency counter → Test pad ECCM(MA2-PCB)

[Procedures]

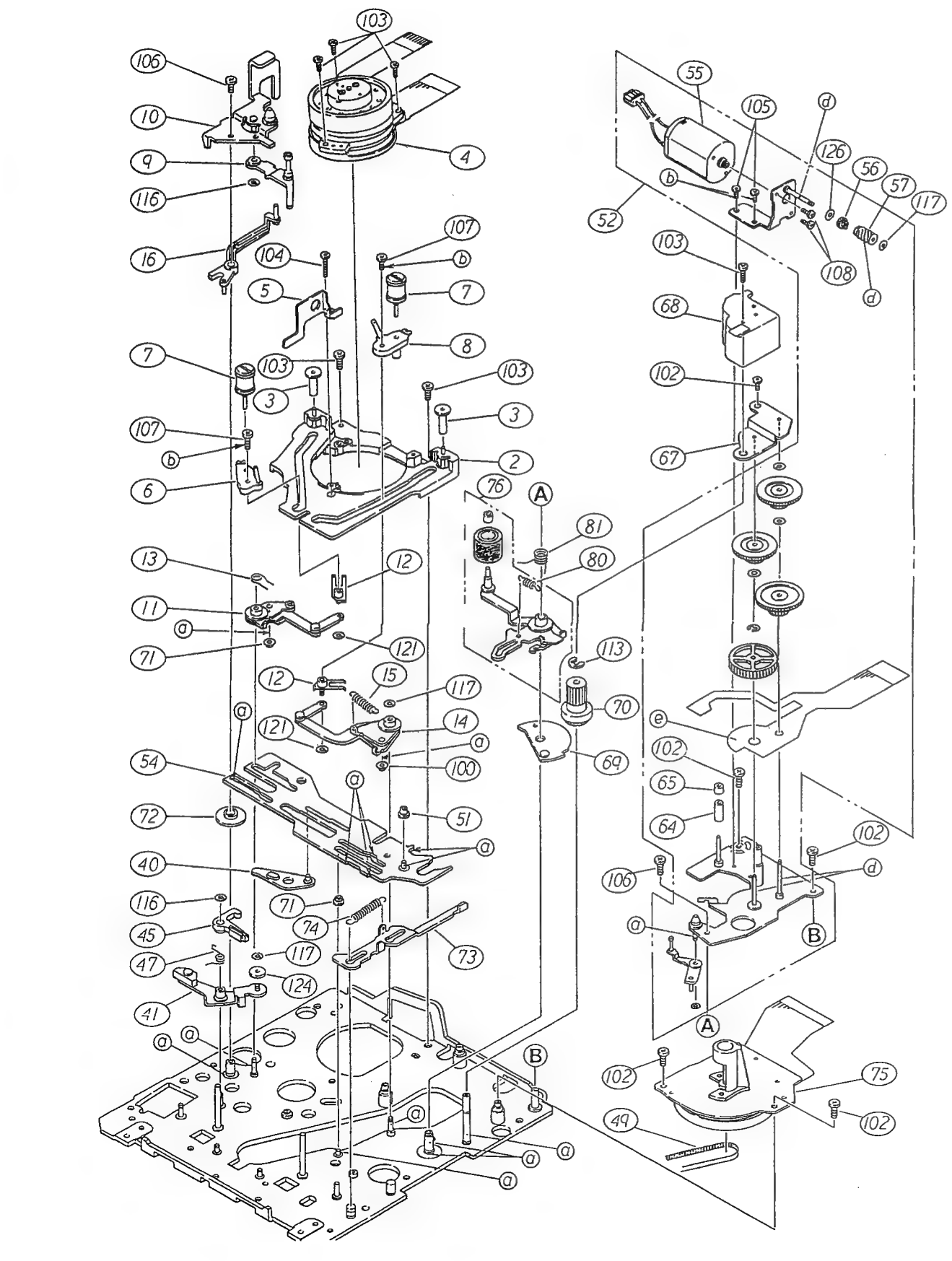
1. Set the test tape **DAT-ER01**
2. Play track № 1, 4 or 24~37(1KHz or 10KHz, 0dB, sine-wave) of the test tape TY7551.
3. Check the frequency counter's reading is 96Hz or below.

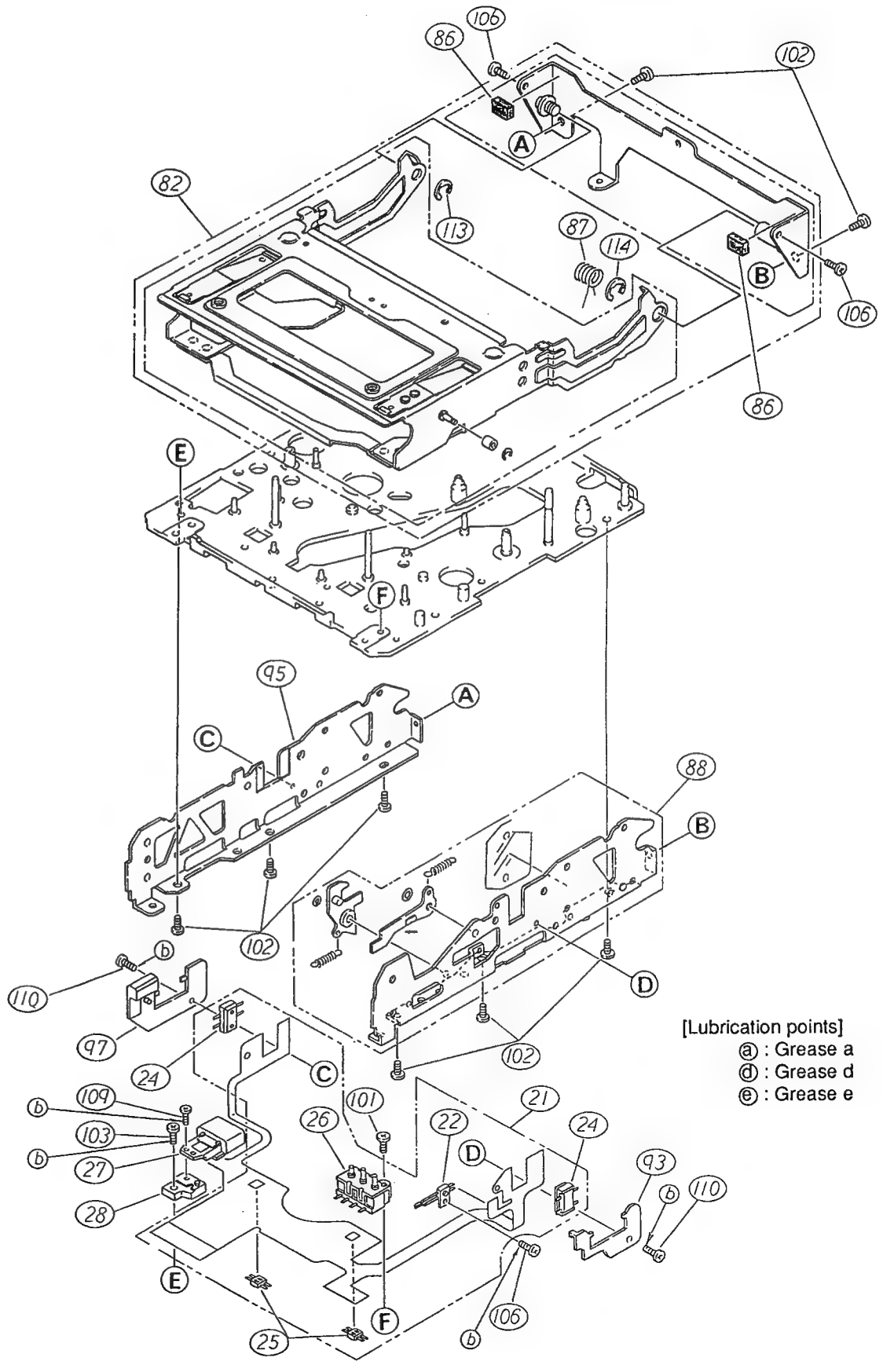
NOTE : The number of the error count varies by the times of the test tape used.

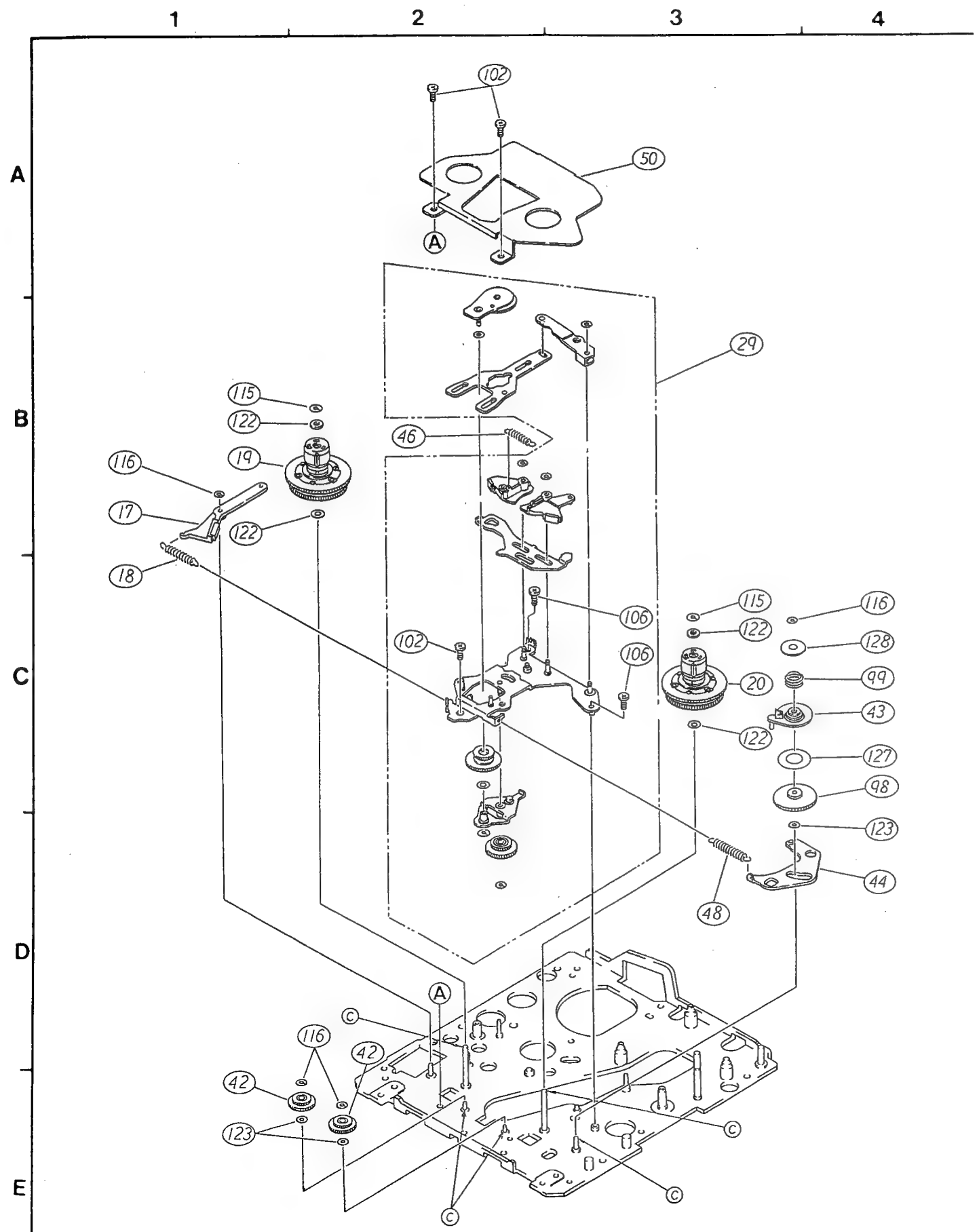
LOCATION OF P.W.B. ADJUSTMENT AND TEST PIN LAYOUT



DAT MECHANISM EXPLODED VIEW







PARTS LIST OF DAT MECHANISM

Ref. No.	Part No.	Part Name	Remarks	Q'ty
1	—	Chassis	72 3233A	1
2	9C1 9090 481	Drum Base	72 3305A	1
3	9C1 9090 482	Tape Protection	72 3347A	2
4	—	Drum Ass'y	72 2056A	1
5	9C1 9090 484	Roller Protection	72 3347A	1
6	9C1 9090 485	Base L Sub Ass'y	72 3308A	1
7	9C1 9090 486	Guide Roller	72 3312A	2
8	9C1 9090 487	Base R Sub Ass'y	72 3319A	1
9	9C1 9090 488	P1 Arm	72 3322A	1
10	9C1 9090 489	P1 Plate	72 3326A	1
11	9C1 9090 490	LD Plate L	72 3331A	1
12	9C1 9090 491	LD Guide Plate	72 3726A	2
13	9C1 9090 492	LD Spring L	72 3341A	1
14	9C1 9090 493	LD Plate R	72 3343A	1
15	9C1 9090 494	LD Spring R	72 3346A	1
16	9C1 9090 495	Tension Arm	72 3426A	1
17	9C1 9090 496	Tension Sub Arm	72 3430A	1
18	9C1 9090 497	Tension Spring	72 3431A	1
19	9C1 9090 498	Supply Reel Disk	72 3349A	1
20	9C1 9090 499	Take Up Reel Disk	72 3356A	1
21	9C1 9090 500	Sensor FPC Ass'y	72 3553A	1
22	9C1 9090 501	Cassette In SW	72 3467A	1
23	—	Sensor FPC	72 3530A	1
24	9C1 9090 503	Tape Sensor	0139-261	2
25	9C1 9040 504	Reel Sensor	0139-584	2
26	9C1 9090 505	Rec SW	72 3424A	1
27	9C1 9090 506	Solenoid	72 3404A	1
28	9C1 9090 507	Solenoid Base	72 3403A	1
29	9C1 9090 508	Reel Drive	72 3358A	1
30	—	Reel Base Ass'y	72 3359A	1
31	—	Swing Arm A	72 3367A	1
32	—	Swing Arm B	72 3372A	1
33	—	Center Pulley	72 3378A	1
34	—	I Lever	72 3382A	1
35	—	Main Brake L	72 3386A	1
36	—	Main Brake R	72 3388A	1
37	—	Brake Off Plate	72 3390A	1
38	—	Selector	72 3391A	1
39	—	FF Swing Gear	72 3392A	1
40	9C1 9090 519	Brake Protection	72 3393A	1
41	9C1 9090 520	Latch Arm	72 3396A	1
42	9C1 9090 521	Reel Idler Gear	72 3405A	2
43	9C1 9090 522	Reel Lock Disk	72 3410A	1
44	9C1 9090 523	Release Lever	72 3412A	1
45	9C1 9090 524	Soft Brake S	72 3415A	1
46	9C1 9090 525	Brake Spring	72 3418A	1
47	9C1 9090 526	Soft Brake Spring	72 3419A	1
48	9C1 9090 527	Release Spring	72 3420A	1
49	9C1 9090 528	Relay Belt	72 3416A	1
50	9C1 9090 529	Cover Plate	72 3417A	1
51	9C1 9090 530	P Roller	72 3302A	1
52	9C1 9090 531	Cam D Ass'y	72 3645A	1
53	—	Gear Base	72 3255A	1
54	9C1 9090 533	Cam	72 3295A	1
55	9C1 9090 534	Motor	72 3467A	1
56	9C1 9090 535	M Gear	72 3284A	1
57	9C1 9090 536	Worm Gear	72 3285A	1
58	—	M Plate	72 3269A	1
59	—	Worm Wheel	72 3286A	1
60	—	Mode Gear 2	72 3288A	1
61	—	Mode Gear 1	72 3287A	1
62	—	Mode Gear 3	72 3648A	1
63	—	Mode Drive FPC	72 3519A	1
64	9C1 9090 543	Tape Guide	72 3294A	1
65	9C1 9090 544	F Stopper	72 3293A	1
66	—	P6 Arm Ass'y	72 3276A	1

Ref. No.	Part No.	Part Name	Remarks	Q'ty
67	9C1 9090 546	Guard Plate	72 3291A	1
68	9C1 9090 547	Tape Guard	72 3292A	1
69	9C1 9090 548	CD Arm	72 3272A	1
70	9C1 9090 549	D Gear	72 3290A	1
71	9C1 9090 550	Cam Roller 1	72 3300A	2
72	9C1 9090 551	Cam Roller 2	72 3301A	1
73	9C1 9090 552	Eject Lever	72 3299A	1
74	9C1 9090 553	Eject Spring	72 3477A	1
75	9C1 9090 554	CP Motor Ass'y	72 3559A	1
76	9C1 9090 555	Pinch Arm	72 3262A	1
77	—	Pinch Roller	72 2821A	1
78	—	Collar	72 2822A	1
79	—	Pinch Sub Ass'y	72 3264A	1
80	9C1 9090 559	Pinch Spring	72 3263A	1
81	9C1 9090 560	P6 Spring	72 3523A	1
82	9C1 9090 561	C Housing Ass'y	72 3669A	1
83	—	Cassete Holder	72 3437A	1
84	—	Roller	72 3446A	1
85	—	Rear Plate Ass'y	72 3447A	1
86	9C1 9090 565	Damper	72 3451A	2
87	9C1 9090 566	Lift Spring	72 3452A	1
88	9C1 9090 567	Side Plate R Ass'y	72 3557A	1
89	9C1 9090 568	Lock	72 3458A	1
90	9C1 9090 569	Release Lock	72 3462A	1
91	9C1 9090 570	Lock Spring	72 3469A	1
92	9C1 9090 571	R Lock Spring	72 3470A	1
93	9C1 9090 572	PC Pusher R	72 3555A	1
94	—	Side Plate R	72 3454A	1
95	9C1 9090 574	Side Plate L	72 3472A	1
96	9C1 9090 575	Sheet	72 3532A	1
97	9C1 9090 576	PC Pusher L	72 3556A	1
98	9C1 9090 577	Slip Gear	72 3409A	1
99	9C1 9090 578	Clutch Spring	72 3719A	1
100	9C1 9090 579	Cam Roller 3	72 3740A	1
101	9C1 9090 580	Screw	0132-761	1
102	9C1 9090 581	Screw	0136-440	16
103	9C1 9090 582	Screw	0085-225	7
104	9C1 9090 583	Screw	0136-457	1
105	9C1 9090 584	Screw	0136-465	2
106	9C1 9090 585	Screw	0136-473	7
107	9C1 9090 586	Screw	0133-736	2
108	9C1 9090 587	Screw	0136-481	2
109	9C1 9090 588	Screw	0139-499	1
110	9C1 9090 589	Screw	0139-089	2
111	—	Ering	0141-051	1
112	—	Ering	0116-749	1
113	9C1 9090 992	Ering	0001-982	2
114	9C1 9090 593	Ering	0136-507	1
115	9C1 9090 594	Slit Washer	71 2811A	2
116	9C1 9090 595	Slit Washer	71 2811J	10
117	9C1 9090 596	Slit Washer	71 2811K	5
118	9C1 9090 597	Slit Washer	71 2811M	1
119	9C1 9090 598	Slit Washer	71 2811N	1
120	—	Slit Washer	71 2811S	1
121	9C1 9090 600	Slit Washer	71 2811R	2
122	9C1 9090 601	Washer P	71 2812A	4
123	9C1 9090 602	Washer P	71 2812E	4
124	9C1 9090 603	Washer P	71 2812G	1
125	—	Washer P	71 2812H	1
126	9C1 9090 605	Washer P	71 2812K	3
127	9C1 9090 606	Washer P	71 2812L	1
128	9C1 9090 607	Washer P	71 2812M	1

NOTE FOR PARTS LIST

- Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicate "1" and "I" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.

WARNING:

Parts marked with this symbol ⚠ ▒ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

17. DAT MECHANISM

17-1. HANDLING PRECAUTIONS.

《Whole Mechanism》

1) When turning the mechanism upside down, hold the Side-Frame(R) ass'y and Side-Frame(L) ass'y
2) Do not touch the Drum ass'y with the naked hand.
3) Do not pile the Mechanisms.
4) Do not touch the connector terminals of FPC and the DEW sensor with the naked hand
5) Do not hold the connector terminals and the FPC, when carrying the Mechanism.
6) Do not touch or scratch the Rollers, Posts and Pinch-Roller.

《Drum ass'y》

1) Do not touch the Drum ass'y with the naked hand.
2) Do not hold the FPC, but hold the flange of Drum ass'y when carrying the Drum ass'y.
3) Put the Drum ass'y on a soft material so that the Drum and the Rotor do not suffer the shock.
4) Do not bend or pull the FPC.
5) Do not solder them near the Drum.
6) Do not put any strength to the upper Drum and the Rotor.

《Capstan Motor》

1) Do not touch the Rotor with metallic objects such as screwdrivers or tweezers.
2) Keep a magnetized material away from the Rotor.
3) Do not put place the Capstan Motor each other.
4) Do not touch the FG sensor.
5) Do not hold the FPC when carrying the Capstan Motor.
6) Do not touch the shaft with the naked hand.

17-2. FUNCTION OF EACH MECHANISM

The DAT Mechanism consists of Tape Loading Mechanism, Reel Driving Mechanism and Cassette Housing.
The following shows functions of each block.

《Tape Loading Mechanism》

Tape Loading Mechanism pulls out a tape from DAT cassette by each Guide Rollers and Guide Poles.
This mechanism wraps the tape around the Drum's circumference correctly.
Loading Motor is driven by DC motor, and controled by Mode Sensor Switch.
Tape running is driven by Capstan Motor.

《Reel Drive Mechanism》

The Reel is turned by the Capstan motor through a Reel Idler Gear and Relay Belt.
Turning effort of the Supply Reel and the Take-Up Reel varies by sliding the Idler Gear to the right or left.
The DC motor and the Tape Loading Mechanism change the recording/playback and FF/REW.

《Cassette Housing》

Cassette Housing consists of Casset Holder, Lift Mechanism and Lock Mechanism.
Cassette Holder opens and closes slider of the cassette and fixes the cassette to regulated position.
Lock Mechanism fixes the Cassette Holder(cassette) to regulated position.
Ejecting of Cassette Holder is driven by the Loading motor.

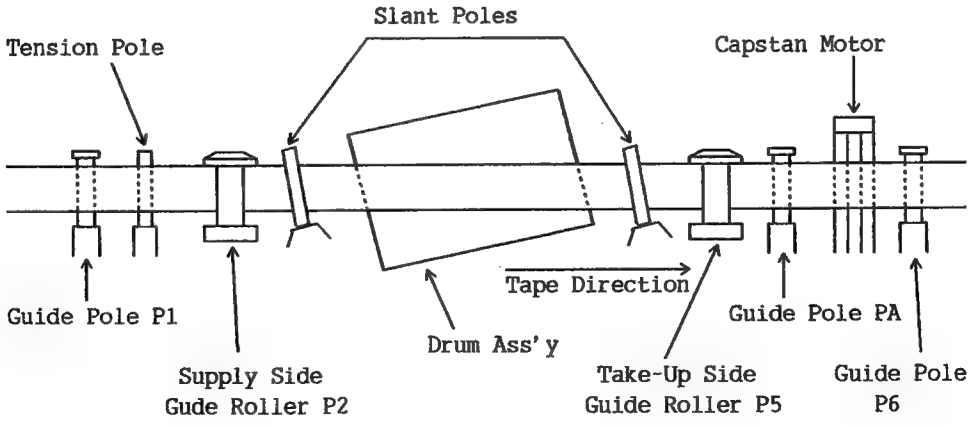


Fig. 11

17-3. DISASSEMBLY (ASSEMBLY)

《Dissassembly procedure》

No.	Disassembled part	Procedure
1	④ Drum ass'y	1. Remove three screws (103). **NOTE** : Be careful not to scratch the Drum and the FPC.
2	(82) C-Housing ass'y	1. Remove two screws (106). 2. Remove twe screws (102). 3. Remove (82) by sliding from (88) and (95).
3	(88) Side Plate R ass'y	1. Remove (82). (As shown in No. 2) 2. Remove the screw (110) and then remove (93). 3. Remove the screw (106). 4. Remove three screws (102).
4	(95) Side Panel (L)	1. Remove (82). (As shown in No. 2) 2. Remove the screw (110) and then remove (97).
5	(21) Sensor FPC ass'y	1. Removee the screw (110) and then remove (93). 2. Remove the screw (106). 3. Remove the screw (110) and then remove (97). 4. Remove the screw (101). 5. Remove (27).
6	(16) Tension Arm	1. Remove (82). (As shown in No. 2) 2. Remove the screw (106) and then remove (10) **NOTE**:Be careful not to lose the spring (13)
7	(49) Relay Belt	1. Be careful not to scratch the Flange (33)
8	(52) Cam D ass'y	1. Remove (82). (As shown in No. 2) 2. Remove the screw (103) and then remove (68) 3. Remove two screws (102) and then remove the screw (106). 4. Remove Cam D ass'y (52). **NOTE** : Do not touch the DEW sensor.
9	(76) Pinch Arm ass'y	1. Remove (52). (As shown in No. 8) 2. Remove the spring (81).
10	(75) CP Motor ass'y	1. Remove (52). (As shown in No. 8) 2. Remove (49). 3. Remove two screws (102).
11	(19) Supply Reel Disk ass'y	1. Remove the spring (18). 2. Remove two screws (102) and then remove (50). 3. Remove (115) and (122) **NOTE** : After carefulling the brake, remove (19).

No.	Disassenbled part	Procedure
12	⑳ Take Up Reel Disk ass'y	1. Remove two screws ⑫ and then remove ⑤⓪. 2. Remove ⑪⑤ and ⑫②.
13	⑰ Tension Sub Arm	1. Remove ⑲. (As shown in No. 6) 2. Remove the spring ⑱ 3. Remove ⑪⑥.
14	㉙ Reel Drive ass'y	1. Remove ㊾. (As shown in No. 6) 2. Remove ⑧②. (As shown in No. 2) 3. Remove ⑲. (As shown in No. 11) 4. Remove ⑳. (As shown in No. 12) 5. Remove three springs ⑱, ㊻ and ㊽. 6. Remove ⑪⑦ and ⑫④. 7. Remove the screw ⑫ and ⑩⑥.
15	㉜ Swing Arm B ass'y	1. Remove ㉙. (As shown in No. 14) 2. Remove ⑪⑥.
16	② Drum base	1. Remove the screw ⑩⑦ and then remove ⑥ 2. Remove the screw ⑩⑦ and then remove ⑧ 3. Remove the screw ⑩④ and then remove ⑤ 4. Remove two screws ⑩③. **NOTE** : Be careful not to touch ⑨ and ⑯.

《Assembly procedure》
Assembly is the reversal of disassembly.

17-4. Back Tension Torque Adjustment.

1. Set the Torque Tape TW7111 and press the "PLAY" button.
2. Adjust as explained below, if Back Tension Torque is not 5.5±3gcm.

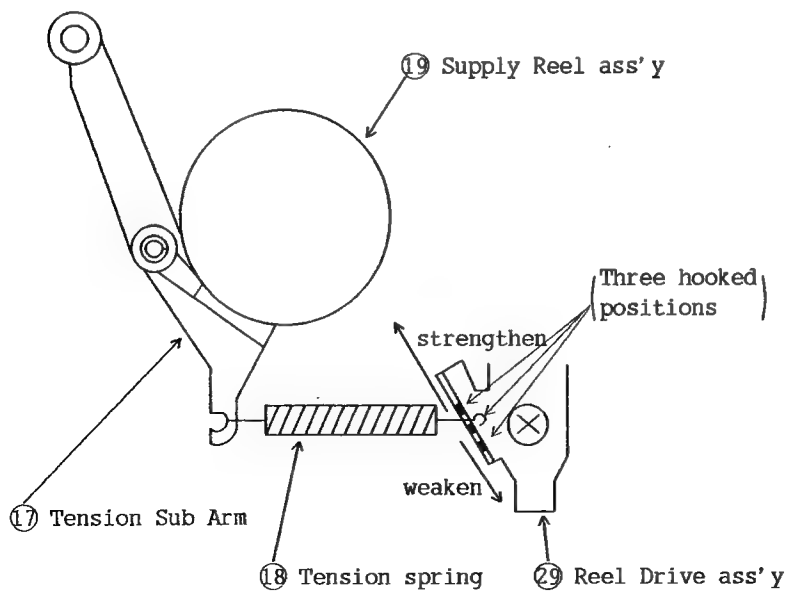
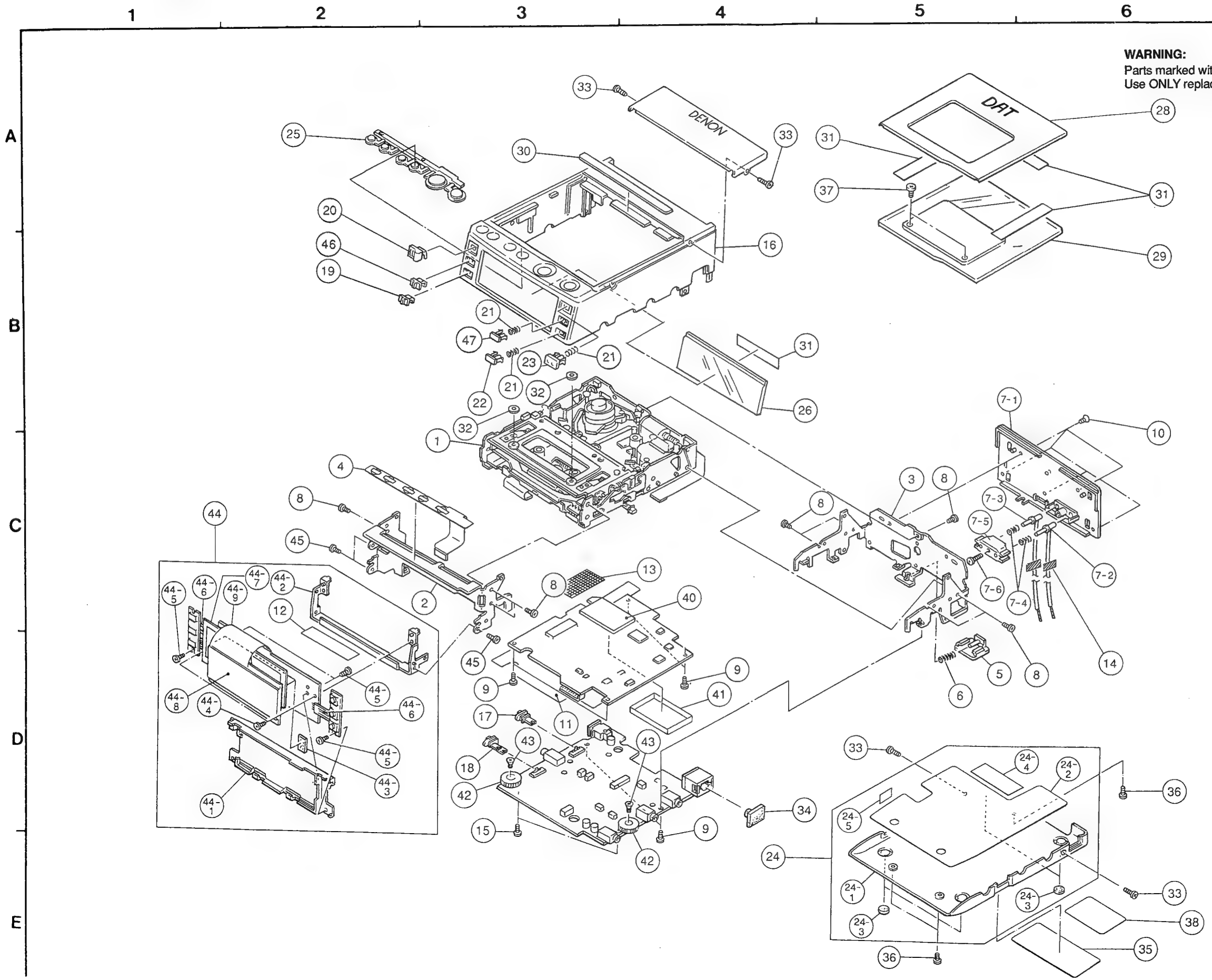


Fig. 12

a) Remove the spring ⑱ of Reel Drive ass'y ㉙ side.
b) Change the hooked position where Tension spring ⑱ is hoked at Reel Drive ass'y ㉙
c) Check back tension torque at the Torque Tape TW7111.
d) Repeat this procedure untill back tension torque is 5.5±3gcm.

18. EXPLODED VIEW

WARNING:
Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.



PARTS LIST OF EXPLODED VIEW

Ref No.	Part No	Part Name	Remarks	Q'ty
1	9C1 0136 414	Y5 mechanism ass'y		1
2	9C6 6069 581	F chassis		1
3	9C6 6069 590	R chassis		1
4	9C3 4120 889	Membrane switch (EJECT/STOP, Play/Pause FF, REW, SKIP(–), SKIP(+))		1
5	9C6 6069 600	B hook		1
6	9C6 6069 612	B spring		1
7-1	9C6 6069 620	Rear Panel		1
7-2	9C6 6069 651	Contact pin		1
7-3	9C6 6069 651	Contact pin		1
7-4	9C6 6069 631	C spring		2
7-5	9C6 6069 640	Pin cover		1
7-6	9C5 8603 885	(+)Screw	1.7 × 6	1
8	9C5 8603 773	(+)Screw	M1.7×1.8 black	8
9	9C5 1120 736	(+)Screw	M1.7×3.5 black	6
10	9C5 8603 759	(+)Screw	M1.7×2.5 black	5
11	9C6 6071 640	MA sield plate		1
12	9C6 6071 650	Insulation plate B		1
13	9C6 6071 660	Copper foil tape A		1
14	9C3 6650 224	Ferrite core	L6T6×2×3	2
15	9C5 8603 913	(+)Screw	M1.7 × 2.5	1
16	9C6 6071 350	Central case	CENTER CABINET	1
17	9C6 6069 411	Slide knob A		1
18	9C6 6069 421	Slide knob B		1
19	9C6 6071 360	Slide knob C (HOLD)		2
20	9C6 6071 370	Slide knob D (POWER)		1
21	—	F spring		3
22	9C6 6071 460	F button B (TIME/LIGHT)		2
23	9C6 6071 390	F button C (REC/REC MUTE)		1
24	—	Lower panel ass'y		1
24-1	9C6 6071 338	Lower panel	BOTTOM COVER	1
24-2	9C6 6069 571	Insulation seat-B		1
24-3	9C6 9903 530	Rubber foot		4
24-4	9C6 6071 510	Rubber seat		1
24-5	9C6 6071 500	Insulation plate		1
25	9C6 6071 400	T button		1
26	9C6 6071 410	DP plate	LCD WINDOW	1
27	9C6 6071 420	Upper panel	TOP PANEL	1
28	9C6 6071 430	Cassette panel	CASSETTE DOOR	1
29	9C6 6071 440	Cassette window		1
30	9C6 6069 530	Blind plate		1
31	9C5 8603 850	Double-sided tape	5+–1×40+–3	4
32	9C6 6071 690	Spacer		2
33	9C5 8603 766	(+)Screw	M1.7×4.5 black Button T. Cover	4
34	9C6 6069 540	Rubber cap		1
35	9C6 6071 471	Rating plate		1
36	9C5 8603 857	(+)Screw	M1.7×3.0 black	1
37	9C5 8604 032	(+)Screw	M2×4.0 black Puton C. Window	2
38	9C6 6071 670	Caution label		1
39	9C6 6071 680	Cushion		1
40	9C6 6069 720	Shield box		1
41	9C6 6069 700	Shield box		1
42	9C6 6069 711	V knob (REC LEVEL, PHONES LEVEL)		2
43	9C5 8603 920	(+)Screw	M1.4×3.5	2
44	9C6 6071 339	LCD holder ass'y		1
44-1	—	LCD holder		1
44-2	—	F metal		1
44-3	—	Cushion		2
44-4	9C5 8603 759	(+)Screw	M1.7×2.5 black	2
44-5	—	(+)Screw	1.7×3.5	4
44-6	9C6 6069 690	EL wire		2
44-7	9C3 1221 869	EL	NEL-5LL-750C(A)	1
44-8	9C3 3352 982	LCD Ass'y	CA273-TNP	1
44-9	—	Heat seal		1
45	9C5 8603 878	(+)Screw	M1.7×1.8Ni	3
46	9C6 6071 450	Slide knob-B (SP.LP)		1
47	9C6 6071 380	F Button-B (MODE)		1
	9C1 0146 743	AC adaptor	AD-L90080J	1
	9C1 0146 750	AC adaptor	AD-L90080U	1
	9C1 0146 757	AC adaptor	AD-L90040G	1
	9C1 0146 764	AC adaptor	AD-L90040E	1
TOOLS				
	9C0 0019 795	Grease a	G-902M	1
	9C0 0019 796	Grease d	G-351	1
	9C0 0019 797	Grease e	AH-137N-2	1
	9C0 0019 891	Test tape	TY-7251A	1
	9C0 0019 890	Test tape	TY-7551	1
	9C0 0019 892	Torque tape	TW-7111	1
PACKING AND ACCESSORIES				
		Inst. Manual (E)		1
		Inst. Manual (E,G,F,IT.)		1
		Inst. Manual (ES,NL,S)		1
		Inst. Manual (PO)		1
	9C5 8600 497	Envelope	for Set	
	9C6 6070 540	Spacer A		
	9C6 6070 550	Spacer B		
	9C6 6070 460	Cushion A		
	9C6 6070 470	Cushion B		
	9C6 6071 520	Carton case		
	9C6 6071 530	Alkaline battery case (AP-20)		
	9C3 7010 434	Connecting Cord Ass'y	2P Pin Cord × 2	
	—	Alkaline Battery (2pcs Pack)	2pcs × 3	3

NOTE FOR PARTS LIST

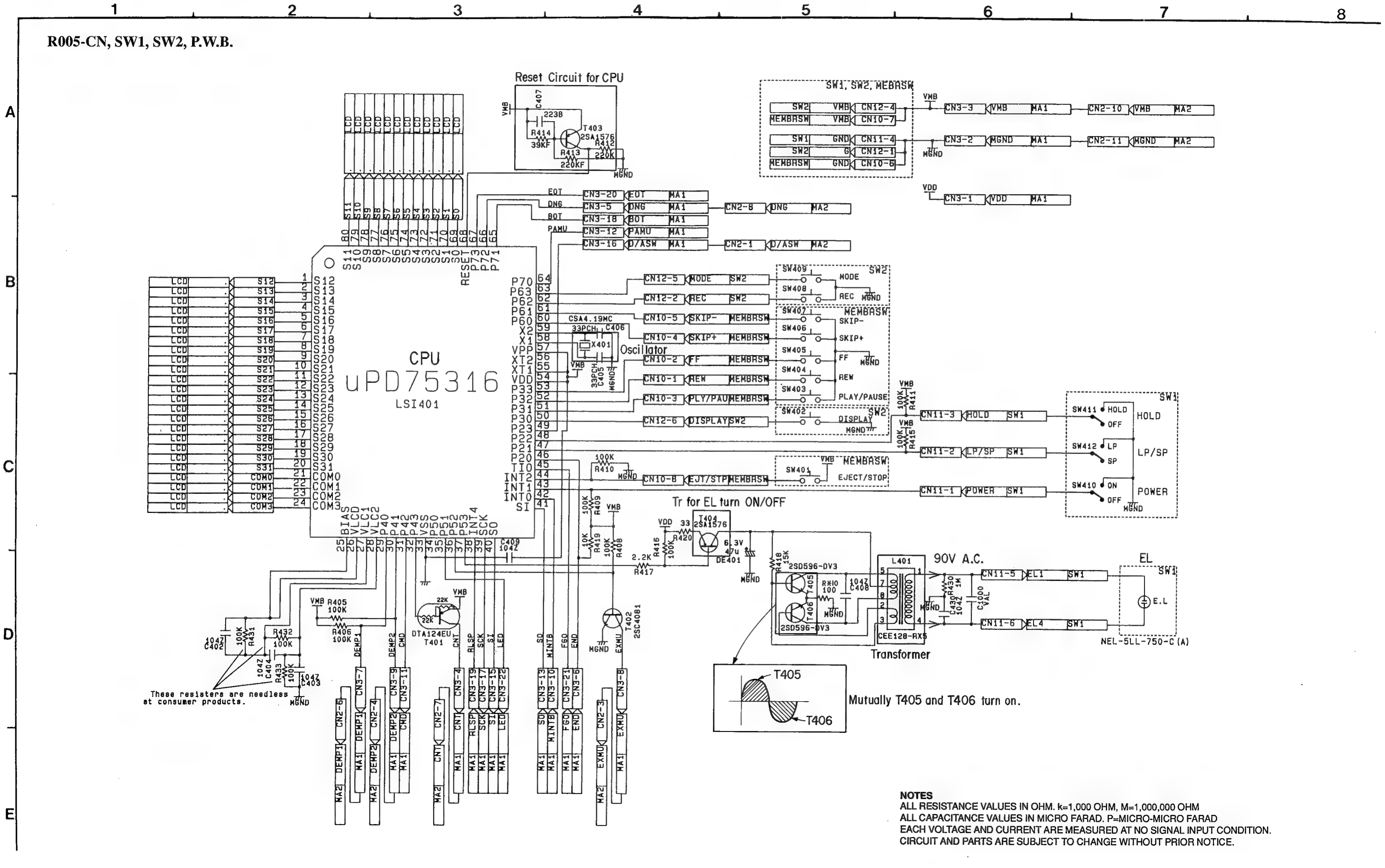
- Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicate "1" and "I" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.

WARNING:

Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

19. SCHEMATIC DIAGRAM

R005-CN, SW1, SW2, P.W.B.



NOTES
ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

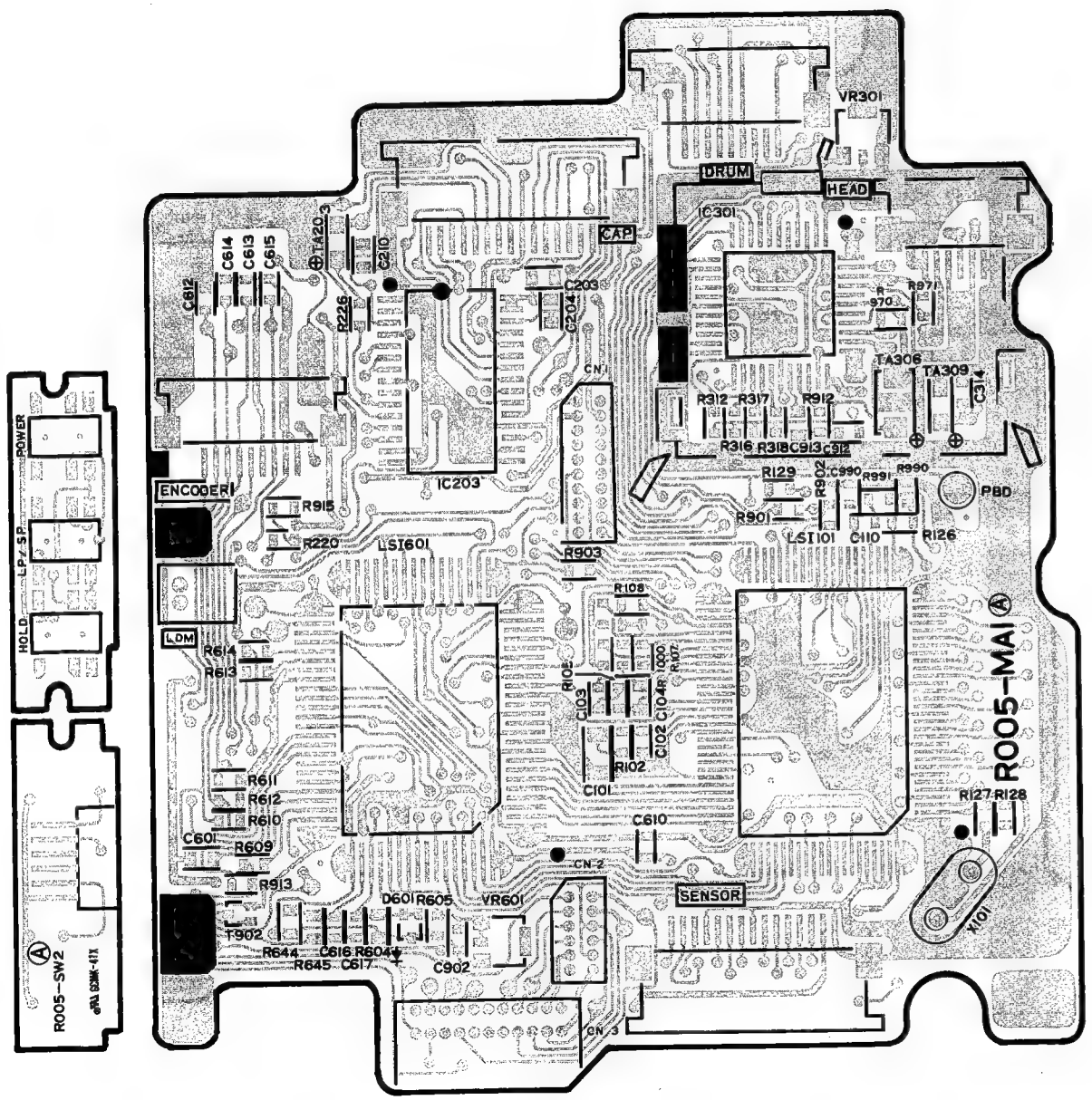
20. PRINTED WIRING BOARD

1 2 3 4 5 6 7 8

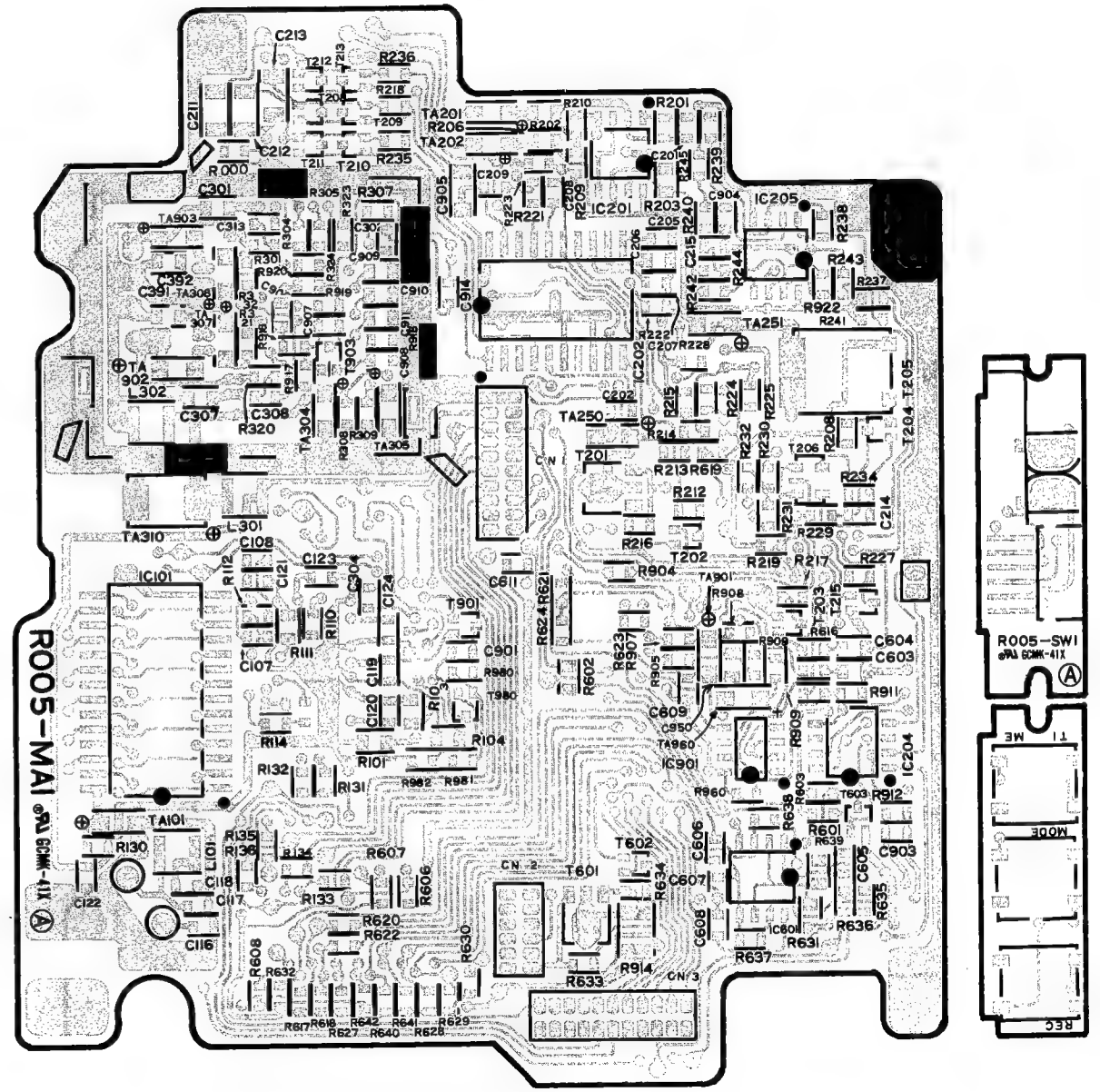
A B C D E

R005-MA1

(TOP VIEW)

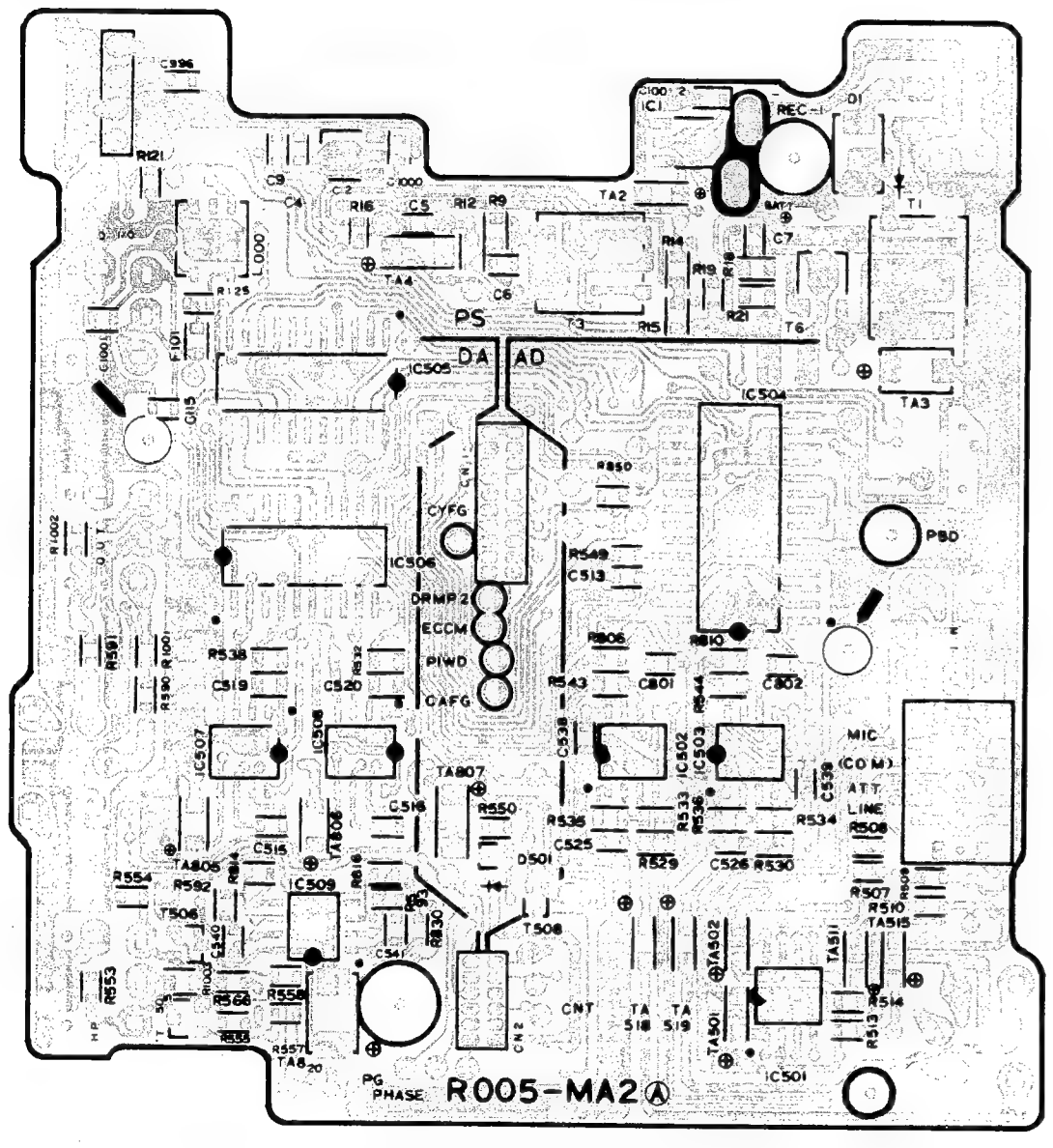


(BOTTOM VIEW)

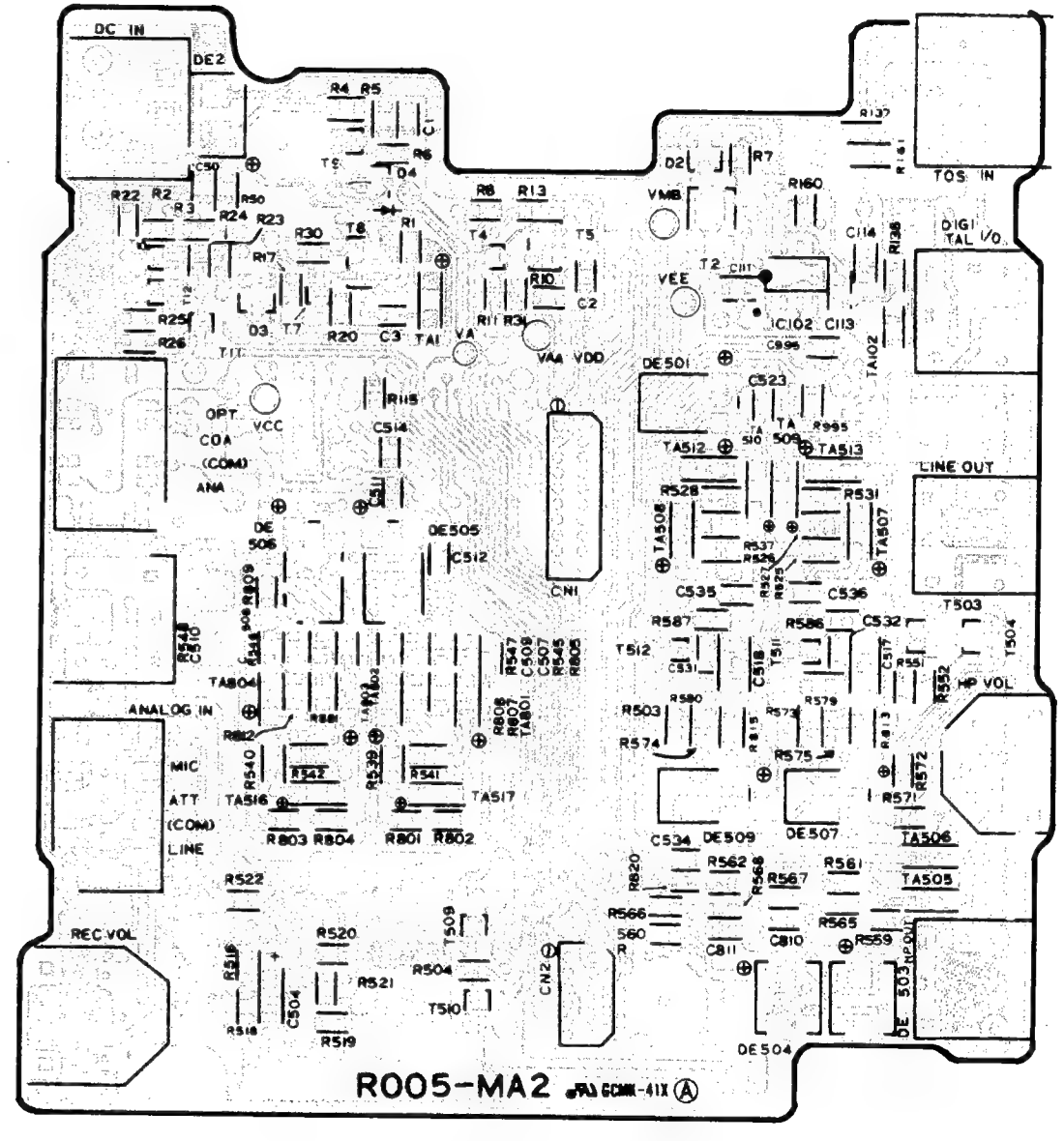


R005-MA2

(TOP VIEW)



(BOTTOM VIEW)

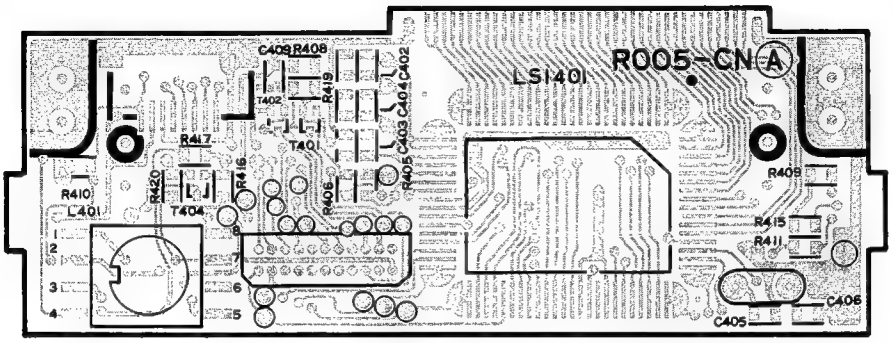


1 2 3 4

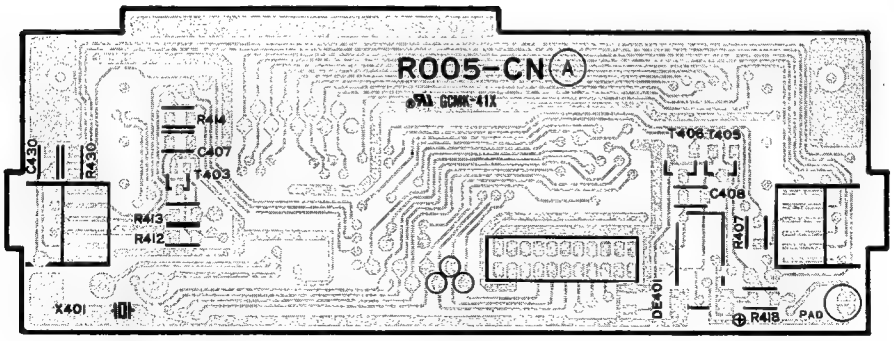
A B C D E

R005-CN

(TOP VIEW)



(BOTTOM VIEW)



21. PARTS LIST

NOTE FOR PARTS LIST

- Part indicated with the mark " ◉ " are not always in stock and possibly to take a long period of time for supplying, or in some case supplying of part may be refused.
- When ordering of part, clearly indicate "1" and "I" (i) to avoid mis-supplying.
- Ordering part without stating its part number can not be supplied.
- Part indicated with the mark "★" is not illustrated in the exploded view.
- Not including Carbon Film ±5%, 1/4W Type in the P.W.Board parts list. (Refer to the Schematic Diagram for those parts.)

WARNING:

Parts marked with this symbol ⚠ ▨ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

• Resistors

Ex.: RN (Type) 14K (Shape and performance) 2E (Power) 182 (Resistance) G (Allowable error) FR (Others)

RD : Carbon RC : Composition RS : Metallic film RW : Winding RN : Metal film RK : Metal mixture	2B : 1/8W 2E : 1/4W 2H : 1/2W 3A : 1W 3D : 2W 3F : 3W 3H : 5W	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20%	P : Pulse-resistant type NL : Low noise type NB : Non-burning type FR : Fuse-resistor F : Lead wire forming

Resistance

1 8 2 ⇒ 1800 ohm = 1.8 kohm
- 2: Indicates number of zeros after effective number
- 18: 2-digit effective numver, decimal point indicated by R.
- Units: ohm

• Capasitors

Ex.: CE (Type) 04W (Shape and performance) 1H (Dielectric strength) 2R2 (Capasity) M (Allowable error) BP (Others)

CE : Aluminum foil electrolyte CA : Aluminum solid electrolyte CS : Tantalm electrolite CQ : Film CK : Ceramic CC : Ceramic CP : Oil CM : Mica CF : Metallized CH : Metallized	0J : 6.3V 1A : 10V 1C : 16V 1E : 25V 1V : 35V 1H : 50V 2A : 100V 2B : 125V 2C : 160V 2D : 200V 2E : 250V 2H : 500V 2J : 630V	F : ±1% G : ±2% J : ±5% K : ±10% M : ±20% Z : +80% Z : –20% P : +100% –0% C : ±0.25pF D : ±0.5pF = : Others	HS : High stability type BP : Non-polar type HR : Ripple-resistant type DL : For charge and discharge HF : For assuring high frequency U : UL part C : CSA part W : UL-CSA type F : Lead wire forming

Capasity

2 R 2 ⇒ 2.2μF
- 2: 1-digit effective number, decimal point indicated by R.
- 2R2: 2-digit effective numver, decimal point indicated by R.

• Units: μF, (for P, pF (μμF))
• When the dielectric strength is indicated in AC, "AC" is included after

PRINTED WIRING BOARD PARTS LIST

SW1 UNIT ASS'Y

Ref. No.	Part No.	Parts Name	Remarks	Q'ty
OTHER PARTS				
SW410	9C3 4120 868	Slide switch SSSS822A POWER		1
SW411	9C3 4120 868	Slide switch SSSS822A HOLD		1
SW412	9C3 4120 868	Slide switch SSSS822A LP/SP		1

SW2 UNIT ASS'Y

Ref. No.	Part No.	Part Name	Remarks	Q'ty
OTHER PARTS				
SW402	9C3 4120 882	Light touch switch SKHUPD DISPLAY		1
SW408	9C3 4120 882	Light touch switch SKHUPD REC		1
SW409	9C3 4120 882	Light touch switch SKHUPD MODE		1

CN UNIT ASS'Y

Ref. No.	Part No.	Part Name	Remarks	Q'ty
SEMICONDUCTORS GROUP				
LSI401	9C2 1052 282	LSI μPD75316GF-191-3B9		1
T401	9C2 2591 330	Chip transistor DTA124EU		
T402	9C2 2520 637	Chip transistor 2SC4081		
T403	9C2 2500 602	Chip transistor 2SA1576		
T404	9C2 2500 602	Chip transistor 2SA1576		
T405	9C2 2530 490	Chip transistor 2SD596		
T406	9C2 2530 490	Chip transistor 2SD596		
RESISTORS GROUP				
R10	9C2 7920 217	Chip resistor	MCR10EZHJ101	
R405	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R406	9C2 7920 209	Chip resistor 100 kOHM, 1/10W	MCR10EZHJ104	
R408	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R409	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R410	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R411	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R412	9C2 7921 116	Chip resistor 220 Kohm, 1/10W	MCR10EZHJ224	
R413	9C2 7952 793	Chip resistor 22 Kohhm, 1/10W ±1%	MCR10EZHF2203	
R414	9C2 7951 330	Chip resistor 3.9 Kohm, 1/10W ±1%	MCR10EZHF3902	
R415	9C2 7920 609	Chip resistor 100 kohm, 1/10W	MCR10EZHJ104	
R416	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R417	9C2 7921 051	Chip resistor 2.2 Kohm, 1/10W	MCR10EZHJ222	
R418	9C2 7920 845	Chip resistor 15 Kohm, 1/10W	MCR10EZHJ153	
R419	9C2 7910 313	Chip resistor 10 Kohm, 1/10W	ERJ-6GEYJK103V	
R420	9C2 7921 124	Chip resistor 33 ohm, 1/10W	MCR10EZHJ330	
R430	9C2 7950 532	Chip resistor 1 Mohm, 1/10W	MCR10EZHJ105	
R431	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R432	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
R433	9C2 7920 209	Chip resistor 100 Kohm, 1/10W	MCR10EZHJ104	
CAPACITORS GROUP				
C402	9C2 8920 040	Chip capacitor 0.1μF/25V	GR40Y5V104Z25PT	
C403	9C2 8920 040	Chip capacitor 0.1μF/25V	GR40Y5V104Z25PT	
C404	9C2 8920 040	Chip capacitor 0.1μF/25V	GR40Y5V104Z25PT	
C405	9C2 8920 261	Chip capacitor 33PF/50V	GR40CH330J50PT	
C406	9C2 8920 261	Chip capacitor 33PF/50V	GR40CH330J50PT	
C407	9C2 8970 539	Chip capacitor 0.022μF/50V	GR40W5R223K50PT	
C408	9C2 8920 040	Chip capacitor 0.1μF/25V	GR40Y5V104Z25PT	
C409	9C2 8920 040	Chip capacitor 0.1μF/25V	GR40Y5V104Z25PT	
C430	9C2 8920 040	Chip capacitor 0.1μF/25V	GR40Y5V104Z25PT	
DE401	9C2 8076 518	Chip electrolytic capacitor 47μF/6.3V	MF6.3FC47D8	
OTHER PARTS				
L401	9C3 7010 399	Transformer	CE128-RX5	
CN3	9C3 5016 146	Connector	52190-2217	
CN10	9C3 5016 111	Connector	52085-0880	

SUB2 UNIT ASS'Y

Ref. No.	Part No.	Part Name	Remarks	Q'ty
SEMICONDUCTORS GROUP				
	9C2 1140 665	IC μPD4572G2		1
RESISTORS GROUP				
	9C2 7980 021	Chip resistor 12Kohm, 1/16W ±0.5%	RN1/16E123D	2
	9C2 7980 007	Chip resistor 10 Kohm, 1/10W, ±0.5%	RN1/16E103D	2
	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333	1
	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222	1
	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104	1
	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ822	1
	9C2 7953 759	Chip resistor 150 Kohm, 1/16W	MCR03EZHJ154	1
	9C2 7953 759	Chip resistor 3 Kohm, 1/16W, ±0.5%	MCR03EZHJ303	1
CAPACITORS GROUP				
	9C2 8971 050	Chip capacitor 1μF/16V	31NC1CE105M	1
	9C2 8452 702	Chip capacitor 0.01μF/25V	10N1EB203K	1
	9C2 8452 730	Chip capacitor 100P/50V	10N1HCH101J	1
	9C2 8951 400	Chip tantalum capacitor 3.3μF/10V	TEMSVA1A335M	1

MA-1 UNIT ASS'Y

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC101	9C2 1142 394	IC TC51832FL-10(EL)	
IC201	9C2 1140 665	IC μPC4572G2	
IC202	9C2 1142 380	IC TDA5140AT	
IC203	9C2 1142 296	IC LB1851M	
IC204	9C2 1142 331	IC BA6208F	
IC205	263 0706 002	Monolithic IC NJM2903M	
IC301	9C2 1142 317	IC TA8174F	
IC601	263 0706 002	Monolithic IC NJM2903M	
IC901	9C2 1142 373	IC TC4W53F (TE12L)	
LSI101	9C2 1142 408	LSI MSM6556-01-V1K-180	
LSI601	9C2 1142 415	LSI MSM6557-01-V1K-181	
T201	9C2 2510 210	Chip transistor 2SB1114	
T202	9C2 2500 602	Chip transistor 2SA1576	
T203	9C2 2591 358	Chip transistor STC144TU	
T204	9C2 2500 602	Chip transistor 2SA1576	
T205	9C2 2510 511	Chip transistor 2SB1203R/S	
T206	9C2 2591 365	Chip transistor FMW1	
T208	9C2 2520 840	Chip transistor 2SC4097	
T209	9C2 2520 840	Chip transistor 2SC4097	
T210	9C2 2520840	Chip transistor 2SC4097	
T211	9C2 2520 840	Chip transistor 2SC4097	
T212	9C2 2520 840	Chip transistor 2SC4097	
T213	9C2 2520 840	Chip transistor 2SC4097	
T215	9C2 2591 358	Chip transistor DTC144TU	
T601	9C2 2510 210	Chip transistor 2SB1114	
T602	9C2 2591 351	Chip transistor DTC143EU	
T603	9C2 2520 637	Chip transistor 2SC4081	
T901	9C2 2591 358	Chip transistor DTC144TU	
T902	9C2 2591 330	Chip transistor DTA124EU	
T903	9C2 2520 637	Chip transistor 2SC4081	
T980	9C2 2500 602	Chip transistor 2SA1576	
D1	9C2 3901 491	Chip diode DSH015	
D601	9C2 3901 435	Chip diode DSH015	
RESISTORS GROUP			
R1	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R2	9C2 7953 934	Chip resistor 2.2 ohm, 1/14W	MCR25PZHJ2R2
R3	9C2 7920 845	Chip resistor 15 Kohm, 1/10W	MCR10EZHJ153
R100	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R101	9C2 7980 252	Chip resistor 1.5 Kohm, 1/16W, ±0.5%	RNC1/16E152DTP
R102	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R103	9C2 7953 780	Chip resistor 130 ohm, 1/10W ±1%	MCR10EZHF1301
R104	9C2 7953 801	Chip resistor 91 ohm, 1/10W ±1%	MCR10EZHF9100
R105	9C2 7953 682	Chip resistor 820 ohm, 1/16W	MCR03EZHJ821
R107	9C2 7953 521	Chip resistor 39 Kohm, 1/16W	MCR03EZHJ393
R108	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R110	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R111	9C2 7953 780	Chip resistor 130 ohm, 1/10W, ±1%	MCR10EZHF1301
R112	9C2 7953 703	Chip resistor 18 Kohm, 1/16W	MCR03EZHJ183
R114	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104

Ref. No.	Part No.	Part Name	Remarks
R126	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R127	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R128	9C2 7953 346	Chip resistor 1 Mohm, 1/10W, ±5%	MCR03EZHJ105
R129	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R130	9C2 7953 710	Chip resistor 22 ohm, 1/16W	MCR03EZHJ220
R131	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R132	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R133	9C2 795 3689	Chip resistor 120 ohm, 1/16W	MCR03EZHJ121
R134	9C2 7953 633	Chip resistor 1.5 Kohm, 1/16W	MCR03EZHJ152
R135	9C2 7953 633	Chip resistor 1.5 Kohm, 1/16W	MCR03EZHJ152
R136	9C2 7953 633	Chip resistor 1.5 Kohm, 1/16W	MCR03EZHJ152
R201	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R202	9C2 7953 787	Chip resistor 27 ohm, 1/10W, ±1%	MCR10EZHF2700
R203	9C2 7952 800	Chip resistor 12 Kohm, 1/10W, ±1%	MCR10EZHF1203
R206	9C2 7953 773	Chip resistor 100 ohm, 1/10W, ±1%	MCR10EZHF1001
R208	9C2 7952 933	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ681
R209	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R210	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R212	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R213	9C2 7953 703	Chip resistor 18 Kohm, 1/10W	MCR03EZHJ183
R214	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333
R215	9C2 7952 982	Chip resistor 12 Kohm, 1/16W	MCR03EZHJ123
R216	9C2 7953 633	Chip resistor 1.5 Kohm, 1/16W	MCR03EZHJ152
R217	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R218	9C2 7953 528	Chip resistor 47 ohm, 1/16W	MCR03EZHJ470
R219	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R220	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R221	9C2 7953 689	Chip resistor 120 ohm, 1/16W	MCR03EZHJ121
R222	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R223	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R224	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R225	9C2 7952 996	Chip resistor 22 Kohm, 1/10W	MCR03EZHJ223
R226	9C2 7953 542	Chip resistor 5.6 Kohm, 1/16W	MCR03EZHJ562
R227	9C2 7953 507	Chip resistor 3.3 Kohm, 1/16W	MCR03EZHJ332
R228	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R229	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R230	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R231	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333
R232	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R234	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R235	9C2 7953 528	Chip resistor 47 ohm, 1/16W	MCR03EZHJ470
R236	9C2 7953 528	Chip resistor 47 ohm, 1/16W	MCR03EZHJ470
R237	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R238	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R239	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R240	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R241	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R242	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R243	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R244	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R245	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R301	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R304	9C2 7953 276	Chip resistor 27 Kohm, 1/16W	MCR03EZHJ273

Ref. No.	Part No.	Part Name	Remarks
R395	9C2 7953 276	Chip resistor 27 Kohm, 1/16W	MCR03EZHJ273
R307	9C2 7953 696	Chip resistor 1.2 Kohm, 1/16W	MCR03EZHJ122
R308	9C2 7953 724	Chip resistor 390 Kohm, 1/16W	MCR03EZHJ394
R309	9C2 7953 724	Chip resistor 390 Kohm, 1/16W	MCR03EZHJ394
R312	9C2 7953 661	Chip resistor 36 Kohm, 1/16W	MCR03EZHJ363
R316	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ823
R317	9C2 7953 276	Chip resistor 27 Kohm, 1/16W	MCR03EZHJ273
R318	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R320	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ823
R321	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R323	9C2 7952 982	Chip resistor 12 Kohm, 1/16W	MCR03EZHJ123
R324	9C2 7953 766	Chip resistor 8.2 Kohm, 1/16W	MCR03EZHJ822
R332	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R601	9C2 7953 717	Chip resistor 270 Kohm, 1/16W	MCR03EZHJ274
R602	9C2 7920 926	Chip resistor 10 ohm, 1/10W	MCR10EZHJ100
R603	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R604	9C2 7300 559	Chip resistor 3 Kohm, 1/10W, ±1%	MCR10EZH3002
R605	9C2 7952 982	Chip resistor 12 Kohm, 1/16W	MCR03EZHJ123
R606	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R607	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R608	9C2 7300 609	Chip resistor 390 ohm, 1/16W	MCR03EZHJ391
R609	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R610	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R611	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R612	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R613	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R614	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R615	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R616	9C2 7953 766	Chip resistor 8.2 Kohm, 1/16W	MCR03EZHJ822
R617	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R618	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R619	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R620	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R621	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R622	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R623	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R624	9C2 7953 017	Chip resistor 100 Kohm, 1/106W	MCR03EZHJ104
R627	9C2 7953 738	Chip resistor 560 ohm, 1/16W	MCR03EZHJ561
R628	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R629	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R630	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R631	9C2 7951 190	Chip resistor 1 Kohm, 1/10W, ±1%	MCR10EZHF1002
R632	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R633	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R634	9C2 7953 605	Chip resistor 470 ohm, 1/16W	MCR03EZHJ471
R635	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R636	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R637	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R638	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R639	9C2 7951 190	Chip resistor 1 Kohm 1/10W, ±1%	MCR10EZHF1002
R640	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R641	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R642	9C2 7300 609	Chip resistor 390 ohm, 1/16W	MCR03EZHJ391

Ref. No.	Part No.	Part Name	Remarks
R644	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103DTP
R645	9C2 7980 007	Chip resistor 10 Kohm 1/16W, ±0.5%	RNC1/16E103DTP
R901	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R902	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R903	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R904	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R905	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R907	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ823
R910	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333
R911	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ823
R912	9C2 7953 374	Chip resistor 150 Kohm, 1/16W	MCR03EZHJ154
R913	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R914	9C2 7953 808	Chip resistor 2.2 ohm, 1/16W	MCR25JZHJ2R2
R915	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R916	9C2 7952 954	Chip resistor 2.7 Kohm, 1/16W	MCR03EZHJ272
R917	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R918	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R919	9C2 7953 703	Chip resistor 18 Kohm, 1/16W	MCR03EZHJ183
R920	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R921	9C2 7952 933	Chip resistor 680 ohm, 1/16W	MCR03EZHJ681
R922	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R960	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ823
R970	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R971	9C2 7952 961	Chip resistor 4.7 Kohm, 1/16W	MCR03EZHJ472
R980	9C2 7953 549	Chip resistor 82 Kohm, 1/16W	MCR03EZHJ823
R981	9C2 7953 276	Chip resistor 27 Kohm, 1/16W	MCR03EZHJ273
R982	9C2 7953 766	Chip resistor 8.2 Kohm, 1/16W	MCR03EZHJ822
R990	9C2 7953 647	Chip resistor 270 ohm, 1/16W	MCR03EZHJ271
R991	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R1000	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333
VR301	9C2 7750 777	Chip semi-fixed resistor EVM-1QSW30B24	REC LEVEL
VR601	9C2 7750 777	Chip semi-ixed resistor EVM-1QSW30B24	Cylinder Phase
CAPACITORS GROUP			
	9C2 8453 150	Chip capacitor 0.22µF/25V	21N1EE224M
C101	9C2 8970 084	Chip capacitor 1µF/16V	GR42-6Y5V105Z16
C102	9C2 8452 611	Chip capacitor 22PF/50V	10N1HCH220J
C103	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C104	9C2 8452 660	Chip capacitor 330PF/50V	21N1HCH331J
C107	9C2 8452 716	Chip capacitor 33PF/50V	10N1HCH330J
C108	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C110	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C116	9C2 8452 695	Chip capacitor 20PF/50V	10N1HCH200J
C117	9C2 8452 681	Chip capacitor 12PF/50V	10N1HCH120J
C118	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C119	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C120	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C121	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C122	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C123	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C124	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z

Ref. No.	Part No.	Part Name	Remarks
C201	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C202	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C203	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C204	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C205	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C206	9C2 8970 952	Chip capacitor 0.015µF/50V	GR40W5R153K50
C207	9C2 8452 779	Chip capacitor 8200PF/25V	10N1EB822K
C208	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C209	9C2 8452 625	Chip capacitor 1000F/50V	10N1HB102K
C210	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C211	9C2 8970 084	Chip capacitor 1µF/16V	GR42-6Y5V105Z16
C212	9C2 8970 084	Chip capacitor 1µF/16V	GR42-6Y5V105Z16
C213	9C2 8970 084	Chip capacitor 1µF/16V	GR42-6Y5V105Z16
C214	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C215	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C301	9C2 8452 660	Chip capacitor 330PF/50V	21N1HC331J
C302	9C2 8452 674	Chip capacitor 56PF/50V	10N1HCH560J
C304	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C307	9C2 8452 660	Chip capacitor 330PF/50V	21N1HCH331J
C308	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C313	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C314	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C391	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C392	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C601	9C2 8452 660	Chip capacitor 3300PF/50V	21N1HCH331J
C603	9C2 8970 945	Chip capacitor 0.047µF/25V	GR40W5R473K25
C604	9C2 8970 945	Chip capacitor 0.047µF/25V	GR40W5R473K25
C605	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C606	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C607	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C608	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C609	9C2 8970 945	Chip capacitor 0.047µF/25V	GR40W5R473K25
C610	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C611	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C612	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C613	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C614	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C615	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C616	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C617	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C901	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C902	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C903	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C904	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C905	9C2 8970 084	Chip capacitor 1µF/16V	GR42-6Y5V105Z16
C906	9C2 8452 737	Chip capacitor 680PF/50V	21N1HCH681J
C907	9C2 8452 730	Chip capacitor 100PF/50V	10N1HCH101J
C908	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C909	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C910	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C911	9C2 8452 667	Chip capacitor 0.22µF/25V	21N1EE224M
C912	9C2 8452 674	Chip capacitor 56PF/50V	10N1HCH560J
C913	9C2 8452 618	Chip capacitor 390PF/50V	21N1HCH391J
C914	9C2 8452 702	Chip capacitor 0.01µF/25V	10N1EB103K
C950	9C2 8452 709	Chip capacitor 0.1µF/16V	10N1CF104Z
C990	9C2 8452 716	Chip capacitor 33PF/50V	10N1HCH330J

MA-2 UNIT ASS'Y

Ref. No.	Part No.	Part Name	Remarks
TA101	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA201	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA202	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA203	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA250	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA251	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA304	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA305	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA306	9C2 8950 105	Chip tantalum capacitor 22µF/4V	ECST0GB226R
TA307	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA308	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA309	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA310	9C2 8951 407	Chip tantalum capacitor 10µF/6.3V	ECST0JB106R
TA901	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA902	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA903	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M

OTHER PARTS				Q'ty
L101	9C3 0131 071	Chip inductor 2.2µH	NL322522-2R2M	
L301	9C3 0130 889	Chip inductor 27µH	NL322522-270J	
L302	9C3 0131 078	Chip inductor 4.7µH	NL322522-4R7M	
CN1	9C3 5016 195	Connector	53130-2017	1
CN2	9C3 5016 188	Connector	53130-1217	1
CN3	9C3 5016 181	Connector	53131-2217	1
CN4	9C3 5016 139	Connector	52207-0690	1
CN5	9C3 5016 125	Connector	52271-0990	1
CN6	9C3 5016 118	Connector	52271-1590	1
CN7	9C3 5016 132	Connector	52207-0990	1
CN8	9C3 5016 118	Connector	52271-1590	1
CN9	9C3 5016 160	Connector	S2B-ZR	1
X101	9C2 5900 700	Ceramic oscillator	AT-49-28.224MHz	1

Ref. No.	Part No.	Part Name	Remarks
SEMICONDUCTORS GROUP			
IC1	9C2 1051 533	C-MOS IC RH5RA50AA	
IC2	9C2 1800 345	C-MOS IC RH5VA43AA	
IC102	9C2 1142 324	IC TC7W04F (TE12L)	
IC502	263 0758 908	IC NJM2100M	
IC503	263 0758 908	IC NJM2100M	
IC504	9C2 1142 388	IC CS5349-KS-E1	
IC505	9C2 1142 366	IC SM5840ES-ET	
IC506	9C2 1142 359	IC PCM68U	
IC507	263 0758 908	IC NJM2100M	
IC508	263 0758 908	IC NJM2100M	
IC509	9C2 1142 352	IC NJM3414M	
T1	9C2 2510 511	Chip transistor 2SB1203R/S	
T2	9C2 2530 245	Chip transistor 2SD1614	
T3	9C2 2510 511	Chip transistor 2SB1203R/S	
T4	9C2 2500 602	Chip transistor 2SA1576	
T5	278 0002 902	Chip transistor FMW1	
T6	9C2 2510 210	Chip transistor 2SB1114	
T7	9C2 2500 602	Chip transistor 2SA1576	
T8	278 0002 902	Chip transistor FMW1	
T9	9C2 2500 602	Chip transistor 2SA1576	
T10	9C2 2520 637	Chip transistor 2SC4081	
T11	9C2 2591 351	Chip transistor DTC143EU	
T12	987 2992 294	Chip transistor DTC143TU	
T503	9C2 2530 238	Chip transistor 2SD1048X7	
T504	9C2 2530 238	Chip transistor 2SD1048X7	
T505	9C2 2530 238	Chip transistor 2SD1048X7	
T506	9C2 2530 238	Chip transistor 2SD1048X7	
T509	9C2 2520 637	Chip transistor 2SC4081	
T510	9C2 2591 358	Chip transistor DTC144TU	
D1	9C2 5901 134	Chip diode DLA11C	
D2	9C2 3601 792	Chip zener diode 02CZ6.2Y	
D3	9C2 3601 792	Chip zener diode 02CZ6.2Y	
D4	9C2 3901 435	Chip diode DSH0015	
D501	9C2 3901 435	Chip diode DSH015	
RESISTORS GROUP			
R1	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R2	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R3	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R4	9C2 7980 042	Chip resistor 22 Kohm, 1/16W, ±0.5%	RNC1/16E223D
R5	9C2 7980 217	Chip resistor 100 Kohm, 1/16W, ±0.5%	RNC1/16E104D
R6	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R7	9C2 7953 654	Chip resistor 360 ohm, 1/16W	MCR03EZHJ361
R8	9C2 7952 982	Chip resistor 12 Kohm, 1/16W	MCR03EZHJ123
R9	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R10	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R11	9C2 7953 640	Chip resistor 2 Kohm, 1/16W	MCR03EZHJ202
R12	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5	RNC1/16E103D
R13	9C2 7952 975	Chip resistor 10 Kohm, 1/16W, ±0.5%	MCR03EZHJ103

Ref. No.	Part No.	Part Name	Remarks
R14	9C2 7300 559	Chip resistor 3 Kohm, 1/10W, ±1%	MCR10EZHF3002
R15	9C2 7300 559	Chip resistor 3 Kohm, 1/10W, ±1%	MCR10EZHF3002
R16	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R17	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R18	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R19	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R20	9C2 7953 668	Chip resistor 3.9 Kohm, 1/16W	MCR03EZHJ392
R21	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R22	9C2 7953 647	Chip resistor 270 ohm, 1/10W	MCR03EZHJ271
R23	9C2 7952 926	Chip resistor 100 ohm, 1/16W	MCR03EZHJ101
R24	9C2 7953 647	Chip resistor 270 ohm, 1/16W	MCR03EZHJ271
R25	9C2 7300 609	Chip resistor 390 ohm, 1/16W	MCR03EZHJ391
R26	9C2 7300 609	Chip resistor 390 ohm, 1/16W	MCR03EZHJ391
R30	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R31	9C2 7952 982	Chip resistor 12 Kohm, 1/16W	MCR03EZHJ123
R115	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R121	9C2 7953 745	Chip resistor 75 ohm, 1/16W	MCR03EZHJ750
R125	9C2 7953 745	Chip resistor 75 ohm, 1/16W	MCR03EZHJ750
R137	9C2 7952 940	Chip resistor 1 Kohm, 1/16W	MCR03EZHJ102
R138	9C2 7953 528	Chip resistor 47 ohm, 1/16W	MCR03EZHJ470
R160	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R161	9C2 7953 647	Chip resistor 270 ohm, 1/16W	MCR03EZHJ271
R503	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R504	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R507	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R508	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R509	9C2 7953 752	Chip resistor 91 Kohm 1/16W	MCR03EZHJ913
R510	9C2 7953 752	Chip resistor 91 Kohm, 1/16W	MCR03EZHJ913
R513	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R514	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R516	9C2 7953 017	Chip resistor 100 Kohm 1/16W	MCR03EZHJ104
R518	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R519	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R520	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R521	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R522	9C2 7953 003	Chip resistor 47 Kohm, 1/16W	MCR03EZHJ473
R525	9C2 7980 224	Chip resistor 1.2 Kohm, 1/16W, ±0.5%	RNC1/16E122D
R526	9C2 7980 224	Chip resistor 1.2 Kohm, 1/16W, ±0.5%	RNC1/16E122D
R527	9C2 7980 238	Chip resistor 680 ohm, 1/16W, ±0.5%	RNC1/16E681D
R528	9C2 7980 238	Chip resistor 680 ohm, 1/16W, ±0.5%	RNC1/16E681D
R529	9C2 7980 217	Chip resistor 100 Kohm, 1/16W, ±0.5%	RNC1/16E104D
R530	9C2 7980 217	Chip resistor 100 Kohm, 1/16W, ±0.5%	RNC1/16E104D
R531	9C2 7980 238	Chip resistor 680 ohm, 1/16W, ±0.5%	RNC1/16E681D
R532	9C2 7980 245	Chip resistor 2.2 Kohm, 1/16W, ±0.5%	RNC1/16E222D

Ref. No.	Part No.	Part Name	Remarks
R533	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R534	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R535	9C2 7980 259	Chip resistor 68 Kohm, 1/16W, ±0.5%	RNC1/16E683D
R536	9C2 7980 259	Chip resistor 68 Kohm, 1/16W, ±0.5%	RNC1/16E683D
R537	9C2 7980 238	Chip resistor 680 ohm, 1/16W, ±0.5%	RNC1/16E681D
R538	9C2 7980 245	Chip resistor 2.2 Kohm, 1/16W, ±0.5%	RNC1/16E222D
R539	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R540	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R541	9C2 7980 245	Chip resistor 2.2 Kohm, 1/16W, ±0.5%	RNC1/16E222D
R542	9C2 7980 245	Chip resistor 2.2 Kohm, 1/16W, ±0.5%	RNC1/16E222D
R543	9C2 7980 245	Chip resistor 2.2 Kohm, 1/16W, ±0.5%	RNA1/16E222D
R544	9C2 7980 245	Chip resistor 2.2 Kohm, 1/16W, ±0.5%	RNA1/16E222D
R545	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R546	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R547	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R548	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R549	9C2 7953 528	Chip resistor 47 ohm, 1/16W	MCR03EZHJ470
R550	9C2 7952 926	Chip resistor 100 ohm, 1/16W	MCR03EZHJ101
R551	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R552	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R553	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R554	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R555	9C2 7953 479	Chip resistor 10 ohm, 1/16W	MCR03EZHJ100
R557	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R558	9C2 7953 500	Chip resistor 2.2 Kohm, 1/16W	MCR03EZHJ222
R559	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R560	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R561	9C2 7300 610	Chip resistor 120 Kohm, 1/16W	MCR03EZHJ124
R562	9C2 7300 610	Chip resistor 120 Kohm, 1/16W	MCR03EZHJ124
R565	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R566	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R567	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R568	9C2 7953 675	Chip resistor 680 Kohm, 1/16W	MCR03EZHJ684
R571	9C2 7953 479	Chip resistor 10 ohm, 1/16W	MCR03EZHJ100
R572	9C2 7953 479	Chip resistor 10 ohm, 1/16W	MCR03EZHJ100
R573	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R574	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R575	9C2 7980 007	Chip resistor 10 Kohm, 1/16W, ±0.5%	RNC1/16E103D
R579	9C2 7980 021	Chip resistor 12 Kohm, 1/16W, ±0.5%	RNC1/16E123D
R580	9C2 7980 021	Chip resistor 12 Kohm, 1/16W, ±0.5%	RNC1/16E123D

Ref. No.	Part No.	Part Name	Remarks
R590	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R591	9C2 7952 975	Chip resistor 10 Kohm, 1/16W	MCR03EZHJ103
R592	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R593	9C2 7953 346	Chip resistor 1 Mohm, 1/16W	MCR03EZHJ105
R630	9C2 7953 479	Chip resistor 10 ohm, 1/16W	MCR03EZHJ100
R801	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R802	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R803	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R804	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R805	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333
R806	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R807	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R808	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R809	9C2 7953 353	Chip resistor 33 Kohm, 1/16W	MCR03EZHJ333
R810	9C2 7952 996	Chip resistor 22 Kohm, 1/16W	MCR03EZHJ223
R812	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R813	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R815	9C2 7953 017	Chip resistor 100 Kohm, 1/16W	MCR03EZHJ104
R830	9C2 7953 479	Chip resistor 10 ohm, 1/16W	MCR03EZHJ100
R850	9C2 7953 633	Chip resistor 1.5 Kohm, 1/16W	MCR03EZHJ152
R881	9C2 7980 231	Chip resistor 27 Kohm, 1/16W, ±0.5%	RNC1/16E273D
R995	9C2 7953 479	Chip resistor 10 ohm, 1/16W	MCR03EZHJ100
R1001	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R1002	9C2 7953 493	Chip resistor 220 ohm, 1/16W	MCR03EZHJ221
R1003	9C2 7953 325	Chip resistor 180 ohm, 1/16W, ±1%	MCR01EZHF1801
VR501	9C2 7650 574	Volume RK08H121-50KC	REC VOL.
VR502	9C2 7651 267	Volume RK08H121-20KC	HEADPHONE VOL.

CAPACITORS GROUP

C1	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF-104Z
C2	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C3	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C4	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C5	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C6	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C7	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C9	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C50	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C111	9C2 8452 702	Chip capacitor 0.01μF/25V	10N1EB103K
C113	9C2 8452 660	Chip capacitor 330PF/50V	21N1HCH331J
C114	9C2 8452 667	Chip capacitor 0.22μF/25V	21N1EE224M
C115	9C2 8452 625	Chip capacitor 1000PF/50V	10N1HB102K
C504	9C2 8951 428	Chip tantalum capacitor 6.8μF/4V	TEMSVA0G685M
C507	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C508	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C509	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C510	9C2 8452 646	Chip capacitor 4700PF/50V	10N1HB472K
C511	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C510	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C513	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C514	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z

Ref. No.	Part No.	Part Name	Remarks
C515	9C2 8452 688	Chip capacitor 180PF/50V	10N1HCH181J
C516	9C2 8452 688	Chip capacitor 180PF/50V	10N1HCH181J
C517	9C2 8971 043	Chip capacitor 120PF/50V	GR42-60H122J50
C518	9C2 8971 043	Chip capacitor 120PF/50V	GR42-6CH122J50
C519	9C2 8452 723	Chip capacitor 360PF/50V	21N1HCH361J
C520	9C2 8452 723	Chip capacitor 360PF/50V	21N1HCH361J
C523	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C525	9C2 8452 730	Chip capacitor 100PF/50V	10N1HCH101J
C526	9C2 8452 730	Chip capacitor 100PF/50V	10N1HCH101J
C535	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C536	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C538	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C539	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C540	9C2 8452 639	Chip capacitor 2700PF/50V	10N1HB272K
C541	9C2 8452 639	Chip capacitor 2700PF/50V	10N1HB272K
C801	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C802	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C810	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C811	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C995	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C996	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C1000	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
C1001	9C2 8452 688	Chip capacitor 180PF/50V	10N1HCH181J
DE2	9C2 8076 504	Chip electrolytic capacitor 10μF/16V	MV16VC10D55
DE501	9C2 8076 497	Chip electrolytic capacitor 10μF/6.3V	MF6.3FC10B6
DE503	9C2 8076 511	Chip electrolytic capacitor 100μF/4V	MV4VC100E55
DE504	9C2 8076 511	Chip electrolytic capacitor 100μF/4V	MV4VC100E55
DE505	9C2 8076 497	Chip electrolytic capacitor 10μF/6.3V	MF6.3FC10B6
DE506	9C2 8076 497	Chip electrolytic capacitor 10μF/6.3V	MF6.3FC10B6
DE507	9C2 8076 490	Chip electrolytic capacitor 22μF/4V	MF4FC22B6
DE509	9C2 8076 490	Chip electrolytic capacitor 22μF/4V	MF4FC22B6
TA1	9C2 8951 428	Chip tantalum capacitor 6.8μF/4V	TEMSVA0G685M
TA2	9C2 8951 400	Chip tantalum capacitor 3.3μF/10V	TEMSVA1A335M
TA3	9C2 8951 421	Chip tantalum capacitor 4.7μF/16V	ECST1CB475R
TA4	9C2 8951 407	Chip tantalum capacitor 10μF/6.3V	ECST0JB106R
TA102	9C2 8452 709	Chip capacitor 0.1μF/16V	10N1CF104Z
TA501	9C2 8951 428	Chip tantalum capacitor 6.8μF/4V	TEMSVA0G685M
TA502	9C2 8951 428	Chip tantalum capacitor 6.8μF/4V	TEMSVA0G685M
TA505	9X2 8970 945	Chip capacitor 0.047μF/25V	GR40W5R473K25
TA506	9C2 8970 945	Chip capacitor 0.047μF/25V	GR40W5R473K25
TA507	9C2 8951 428	Chip tantalum capacitor 6.8μF/4V	TEMSVA0G685M
TA508	9C2 8951 428	Chip tantalum capacitor 6.8μF/4V	TEMSVA0G685M
TA509	9C2 8951 400	Chip tantalum capacitor 3.3μF/10V	TEMSVA1A335M

Ref. No.	Part No.	Part Name	Remarks
TA510	9C2 8951 400	Chip tantalum capacitor 3.3µF/10V	TEMSVA1A335M
TA511	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA512	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA513	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA515	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA516	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA517	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA518	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA519	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA801	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA802	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA803	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA804	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA805	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA806	9C2 8951 428	Chip tantalum capacitor 6.8µF/4V	TEMSVA0G685M
TA807	9C2 8951 421	Chip tantalum capacitor 4.7µF/16V	ECST1CB475R
TA820	9C2 8951 414	Chip tantalum capacitor 33µF/6.3V	ECST0JC336R

OTHER PARTS				Q'ty
JK100	9C3 5015 334	Jack (DC Jack)	LGP3331-0140	
JK101	9C3 5016 153	Jack (Digital In/Out Jack)	03-441A1	
JK102	9C3 5016 153	Jack (Line Out Jack)	03-441A1	
JK103	9C3 5016 153	Jack (Head Phone Jack)	03-441A1	
JK104	9C3 5016 153	Jack (Analog Input Jack)	03-441A1	
L000	9C3 0650 357	Pulse transformer	CP4L2-RX5	
SW101	9C3 4120 875	Slide switch SSSS823A	DIGITAL, ANALOG	
SW501	9C3 4120 875	Slide switch SSSS823A	MIC/LINE	
SW601	9C3 4120 875	Slide switch SSSS823A	MIC/LINE	
CN1	9C3 5016 174	Connector	52190-2017	1
CN2	9C3 5016 167	Connector	52190-1217	1
F101	9C3 0130 868	Chip inductor	BLM21A05PT	1
TOS1	9C1 0136 428	TOSLINK (Optical Input)	T0RX173	1

DENON

NIPPON COLUMBIA CO., LTD.

14-14, AKASAKA 4-CHOME, MINATO-KU, TOKYO 107-11, JAPAN
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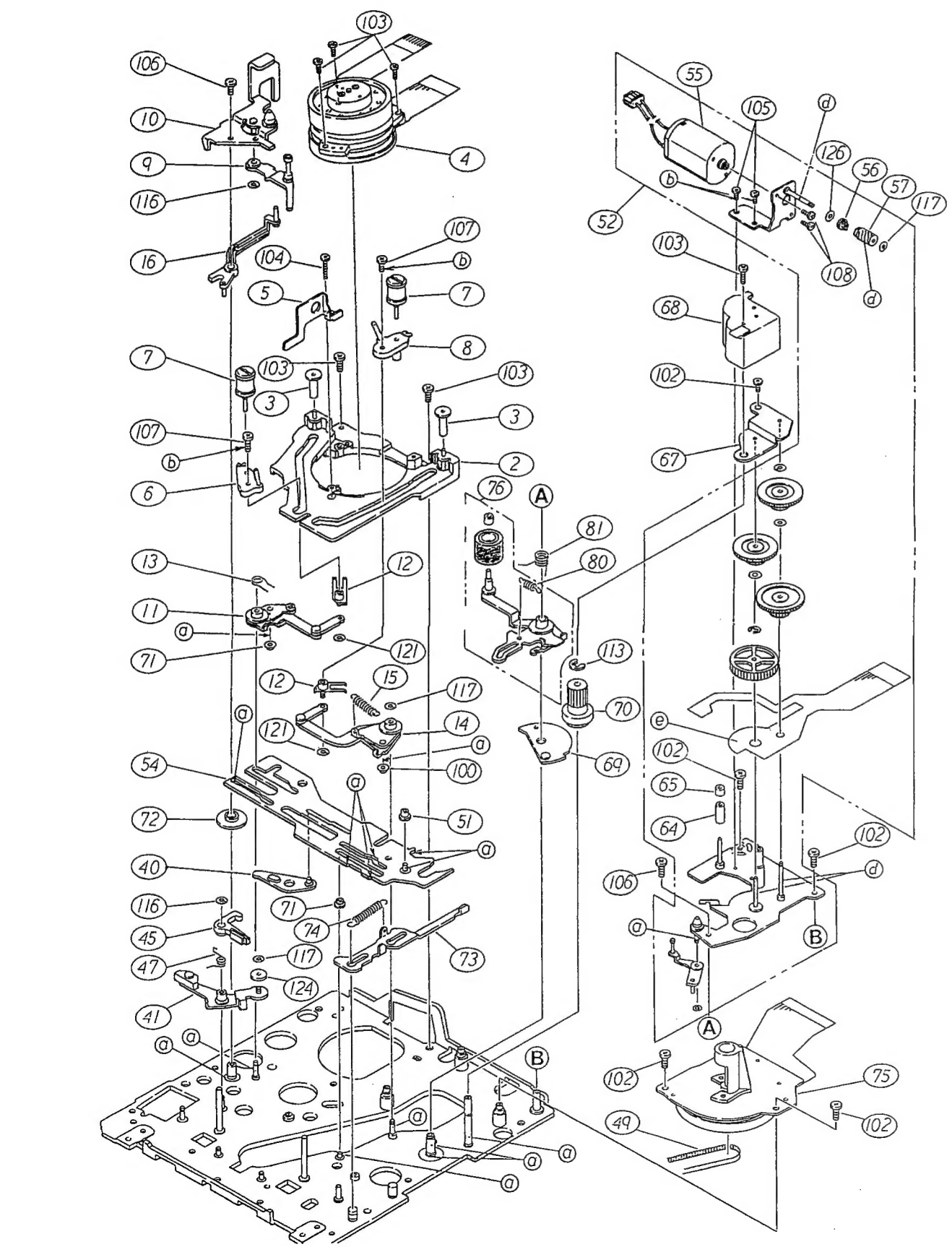
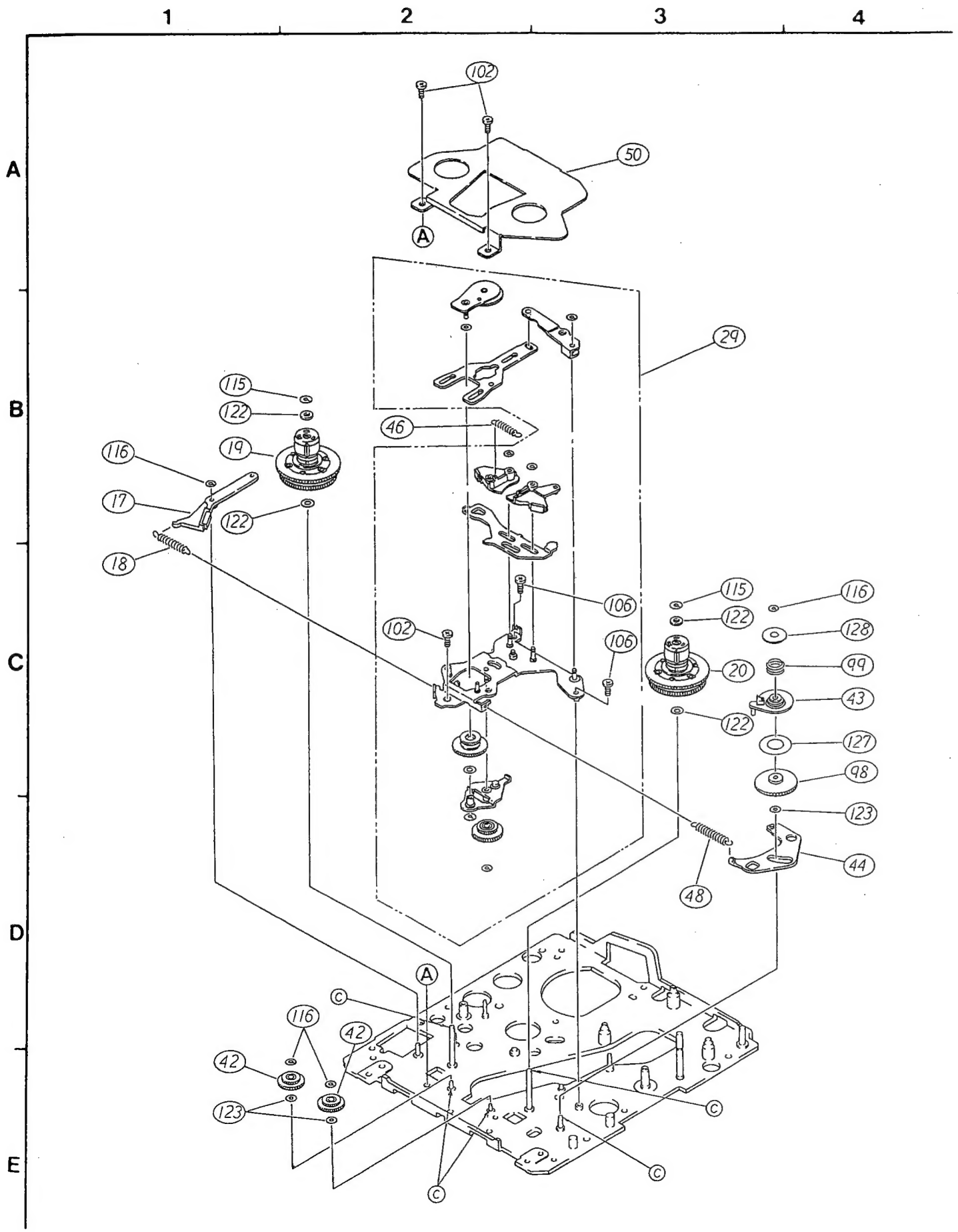
DAT MECHANISM EXPLODED VIEW



[Lubrication points]
ⓐ : Grease a
ⓓ : Grease d
ⓔ : Grease e

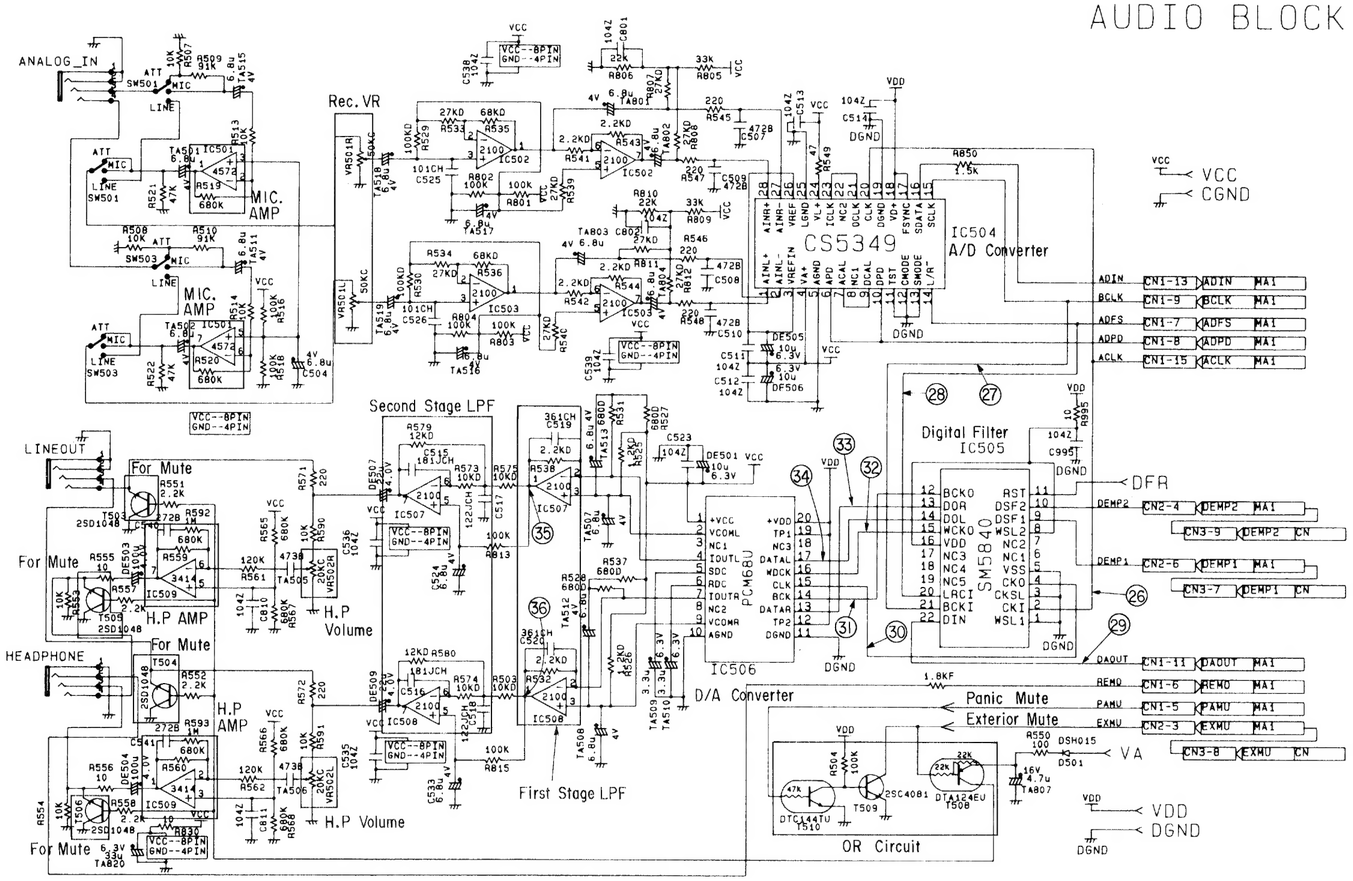


PARTS LIST OF DAT MECHANISM

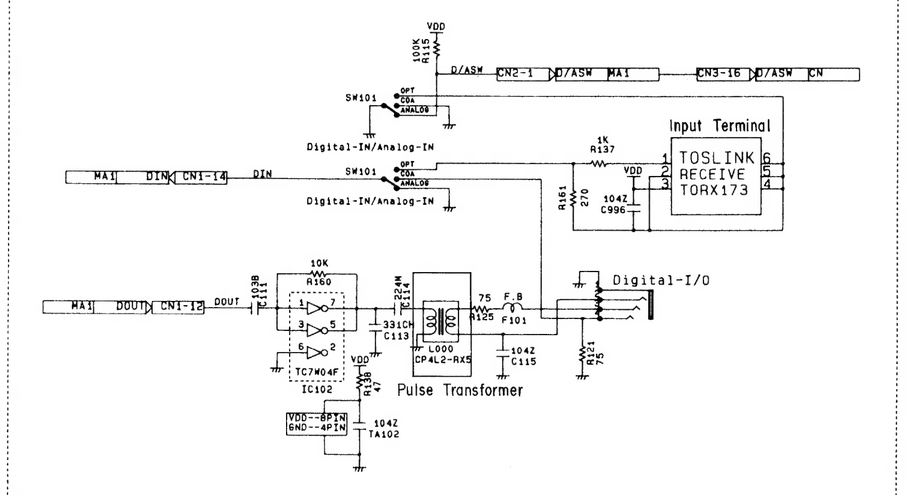
Ref. No.	Part No.	Part Name	Remarks	Q'ty
1	—	Chassis	72 3233A	1
2	9C1 9090 481	Drum Base	72 3305A	1
3	9C1 9090 482	Tape Protection	72 3347A	2
4	—	Drum Ass'y	72 2056A	1
5	9C1 9090 484	Roller Protection	72 3347A	1
6	9C1 9090 485	Base L Sub Ass'y	72 3308A	1
7	9C1 9090 486	Guide Roller	72 3312A	2
8	9C1 9090 487	Base R Sub Ass'y	72 3319A	1
9	9C1 9090 488	P1 Arm	72 3322A	1
10	9C1 9090 489	P1 Plate	72 3326A	1
11	9C1 9090 490	LD Plate L	72 3331A	1
12	9C1 9090 491	LD Guide Plate	72 3726A	2
13	9C1 9090 492	LD Spring L	72 3341A	1
14	9C1 9090 493	LD Plate R	72 3343A	1
15	9C1 9090 494	LD Spring R	72 3346A	1
16	9C1 9090 495	Tension Arm	72 3426A	1
17	9C1 9090 496	Tension Sub Arm	72 3430A	1
18	9C1 9090 497	Tension Spring	72 3431A	1
19	9C1 9090 498	Supply Reel Disk	72 3349A	1
20	9C1 9090 499	Take Up Reel Disk	72 3356A	1
21	9C1 9090 500	Sensor FPC Ass'y	72 3553A	1
22	9C1 9090 501	Cassette In SW	72 3467A	1
23	—	Sensor FPC	72 3530A	1
24	9C1 9090 503	Tape Sensor	0139-261	2
25	9C1 9040 504	Reel Sensor	0139-584	2
26	9C1 9090 505	Rec SW	72 3424A	1
27	9C1 9090 506	Solenoid	72 3404A	1
28	9C1 9090 507	Solenoid Base	72 3403A	1
29	9C1 9090 508	Reel Drive	72 3358A	1
30	—	Reel Base Ass'y	72 3359A	1
31	—	Swing Arm A	72 3367A	1
32	—	Swing Arm B	72 3372A	1
33	—	Center Pulley	72 3378A	1
34	—	I Lever	72 3382A	1
35	—	Main Brake L	72 3386A	1
36	—	Main Brake R	72 3388A	1
37	—	Brake Off Plate	72 3390A	1
38	—	Selector	72 3391A	1
39	—	FF Swing Gear	72 3392A	1
40	9C1 9090 519	Brake Protection	72 3393A	1
41	9C1 9090 520	Latch Arm	72 3396A	1
42	9C1 9090 521	Reel Idler Gear	72 3405A	2
43	9C1 9090 522	Reel Lock Disk	72 3410A	1
44	9C1 9090 523	Release Lever	72 3412A	1
45	9C1 9090 524	Soft Brake S	72 3415A	1
46	9C1 9090 525	Brake Spring	72 3418A	1
47	9C1 9090 526	Soft Brake Spring	72 3419A	1
48	9C1 9090 527	Release Spring	72 3420A	1
49	9C1 9090 528	Relay Belt	72 3416A	1
50	9C1 9090 529	Cover Plate	72 3417A	1
51	9C1 9090 530	P Roller	72 3302A	1
52	9C1 9090 531	Cam D Ass'y	72 3645A	1
53	—	Gear Base	72 3255A	1
54	9C1 9090 533	Cam	72 3295A	1
55	9C1 9090 534	Motor	72 3467A	1
56	9C1 9090 535	M Gear	72 3284A	1
57	9C1 9090 536	Worm Gear	72 3285A	1
58	—	M Plate	72 3269A	1
59	—	Worm Wheel	72 3286A	1
60	—	Mode Gear 2	72 3288A	1
61	—	Mode Gear 1	72 3287A	1
62	—	Mode Gear 3	72 3648A	1
63	—	Mode Drive FPC	72 3519A	1
64	9C1 9090 543	Tape Guide	72 3294A	1
65	9C1 9090 544	F Stopper	72 3293A	1
66	—	P6 Arm Ass'y	72 3276A	1

Ref. No.	Part No.	Part Name	Remarks	Q'ty
67	9C1 9090 546	Guard Plate	72 3291A	1
68	9C1 9090 547	Tape Guard	72 3292A	1
69	9C1 9090 548	CD Arm	72 3272A	1
70	9C1 9090 549	D Gear	72 3290A	1
71	9C1 9090 550	Cam Roller 1	72 3300A	2
72	9C1 9090 551	Cam Roller 2	72 3301A	1
73	9C1 9090 552	Eject Lever	72 3299A	1
74	9C1 9090 553	Eject Spring	72 3477A	1
75	9C1 9090 554	CP Motor Ass'y	72 3559A	1
76	9C1 9090 555	Pinch Arm	72 3262A	1
77	—	Pinch Roller	72 2821A	1
78	—	Collar	72 2822A	1
79	—	Pinch Sub Ass'y	72 3264A	1
80	9C1 9090 559	Pinch Spring	72 3263A	1
81	9C1 9090 560	P6 Spring	72 3523A	1
82	9C1 9090 561	C Housing Ass'y	72 3669A	1
83	—	Cassete Holder	72 3437A	1
84	—	Roller	72 3446A	1
85	—	Rear Plate Ass'y	72 3447A	1
86	9C1 9090 565	Damper	72 3451A	2
87	9C1 9090 566	Lift Spring	72 3452A	1
88	9C1 9090 567	Side Plate R Ass'y	72 3557A	1
89	9C1 9090 568	Lock	72 3458A	1
90	9C1 9090 569	Release Lock	72 3462A	1
91	9C1 9090 570	Lock Spring	72 3469A	1
92	9C1 9090 571	R Lock Spring	72 3470A	1
93	9C1 9090 572	PC Pusher R	72 3555A	1
94	—	Side Plate R	72 3454A	1
95	9C1 9090 574	Side Plate L	72 3472A	1
96	9C1 9090 575	Sheet	72 3532A	1
97	9C1 9090 576	PC Pusher L	72 3556A	1
98	9C1 9090 577	Slip Gear	72 3409A	1
99	9C1 9090 578	Clutch Spring	72 3719A	1
100	9C1 9090 579	Cam Roller 3	72 3740A	1
101	9C1 9090 580	Screw	0132-761	1
102	9C1 9090 581	Screw	0136-440	16
103	9C1 9090 582	Screw	0085-225	7
104	9C1 9090 583	Screw	0136-457	1
105	9C1 9090 584	Screw	0136-465	2
106	9C1 9090 585	Screw	0136-473	7
107	9C1 9090 586	Screw	0133-736	2
108	9C1 9090 587	Screw	0136-481	2
109	9C1 9090 588	Screw	0139-499	1
110	9C1 9090 589	Screw	0139-089	2
111	—	Ering	0141-051	1
112	—	Ering	0116-749	1
113	9C1 9090 992	Ering	0001-982	2
114	9C1 9090 593	Ering	0136-507	1
115	9C1 9090 594	Slit Washer	71 2811A	2
116	9C1 9090 595	Slit Washer	71 2811J	10
117	9C1 9090 596	Slit Washer	71 2811K	5
118	9C1 9090 597	Slit Washer	71 2811M	1
119	9C1 9090 598	Slit Washer	71 2811N	1
120	—	Slit Washer	71 2811S	1
121	9C1 9090 600	Slit Washer	71 2811R	2
122	9C1 9090 601	Washer P	71 2812A	4
123	9C1 9090 602	Washer P	71 2812E	4
124	9C1 9090 603	Washer P	71 2812G	1
125	—	Washer P	71 2812H	1
126	9C1 9090 605	Washer P	71 2812K	3
127	9C1 9090 606	Washer P	71 2812L	1
128	9C1 9090 607	Washer P	71 2812M	1

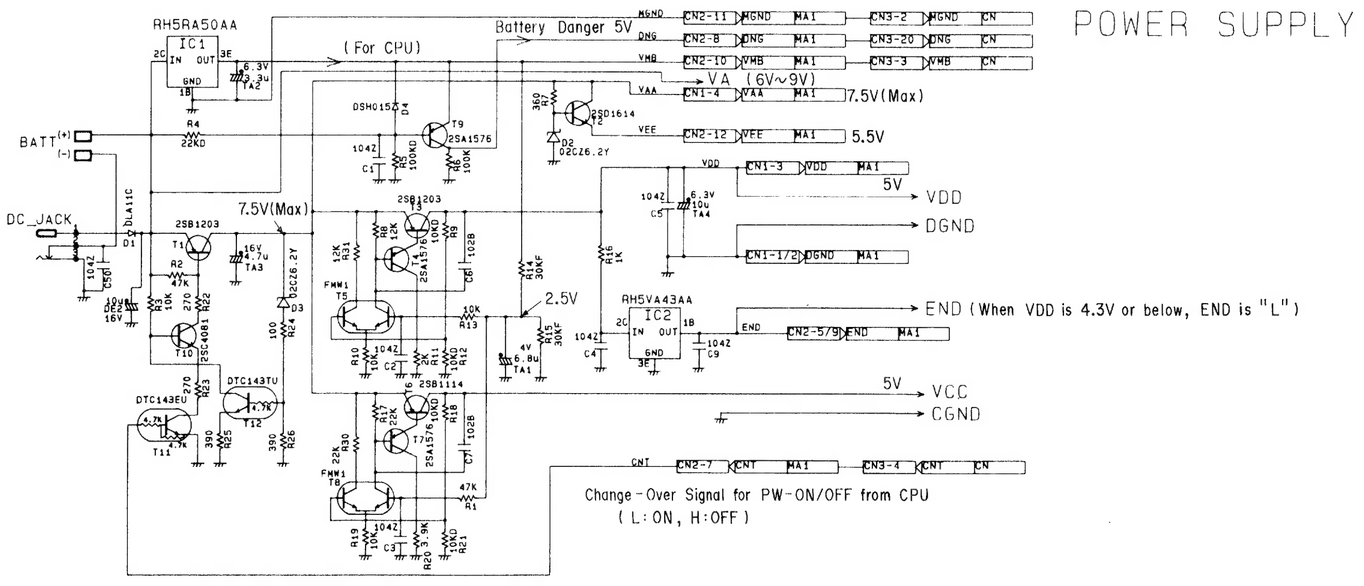
AUDIO BLOCK



DIGITAL IO

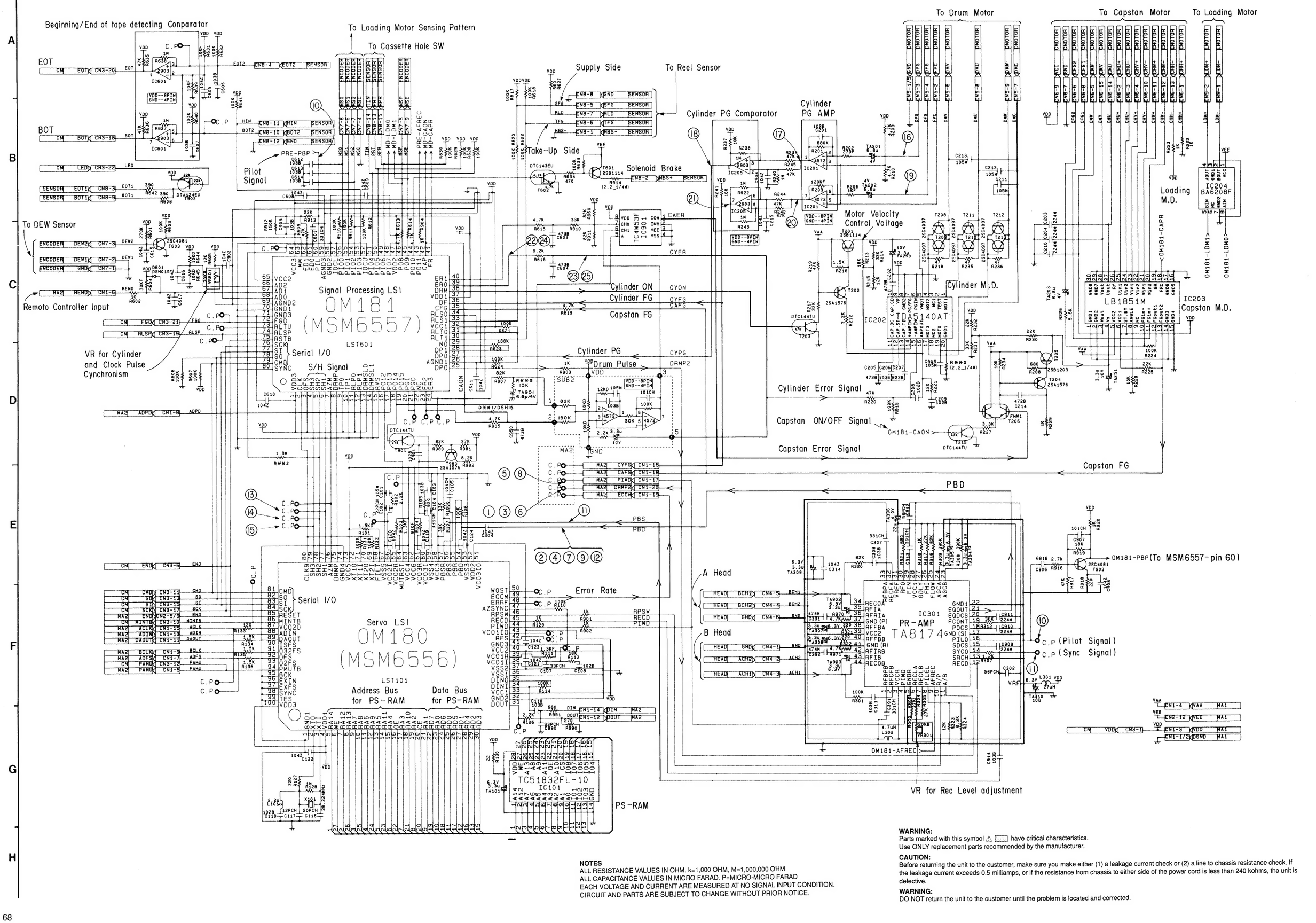


POWER SUPPLY



NOTES
ALL RESISTANCE VALUES IN OHM. k=1,000 OHM, M=1,000,000 OHM
ALL CAPACITANCE VALUES IN MICRO FARAD. P=MICRO-MICRO FARAD
EACH VOLTAGE AND CURRENT ARE MEASURED AT NO SIGNAL INPUT CONDITION.
CIRCUIT AND PARTS ARE SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

R005-MA1, SUB2, SW2 P.W.B.



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WARNING:
Parts marked with this symbol ⚠ have critical characteristics.
Use ONLY replacement parts recommended by the manufacturer.

CAUTION:
Before returning the unit to the customer, make sure you make either (1) a leakage current check or (2) a line to chassis resistance check. If the leakage current exceeds 0.5 milliamps, or if the resistance from chassis to either side of the power cord is less than 240 kohms, the unit is defective.

WARNING:
DO NOT return the unit to the customer until the problem is located and corrected.